Industrial Finishing

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Published Monthly at Indianapolis, Indiana

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National Headquarters
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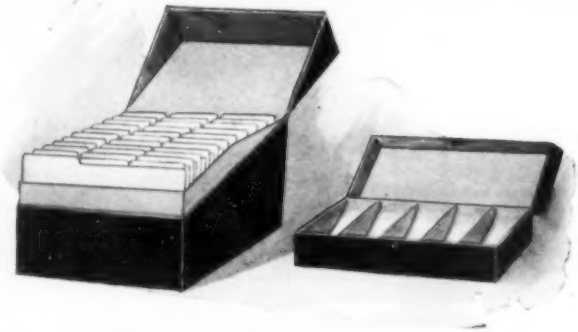

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Industrial Finishing

An Independent Publication Devoted To The Finishing of Industrial Products

CONTENTS FOR MAY, 1927

With the Editor 7
The Finished Surface a Sales Feature, by John R. Kingley 8
Graining With the Spray Gun, by C. D. Wehmer 12
Lacquering Over Old Paint and Varnish, by News 21
Tumbling as a Finishing Process, by Donald A. Hampson 22
Why Viscosity Tests Are Important—II, by W. H. Martindale 28
Finishing Toy Boats, by Joseph Cowan 32
Colorimetry in Modern Wood Finishing, by Samuel S. Harkavy 34
Lacquered "Art Pianos," by Joseph Cowan 36
Low-Cost Finish for Machines, by Donald A. Hampson 39
Finishing Management—A Problem, by E. F. Werner 42
Tung Oil and Other Oils, by Russell A. Brandt 52
Editorial 58
Questions and Answers 60
Lacquered Decalcomania, by S. K. M. Co. and I. F. 60
Light Walnut Fixtures, by C. H. P. and I. F. 62
Silver Gray Oak, by C. C. Co. and I. F. 62
Antique Walnut Finish, by H. E. C. and R. L. Masterson 64
Comments on March Articles, by O. T. Norot 66
Portable Baffle News 66
Baked Finishing Section 67
Tests of Finish Drying Ovens, by Londoner 69
Japanning Methods—And Ovens, by Earl Thornton 72
Refinishing Motor Cars in Small Shop, by K. N. Kathju, M. S. 78
Cleaning Aluminum Castings, by International Chemical Co. 86
White and Light-Tinted Enamels, by B. Villa 89
Two-Tone Staining With the Spray, by W. J. Kitely 93

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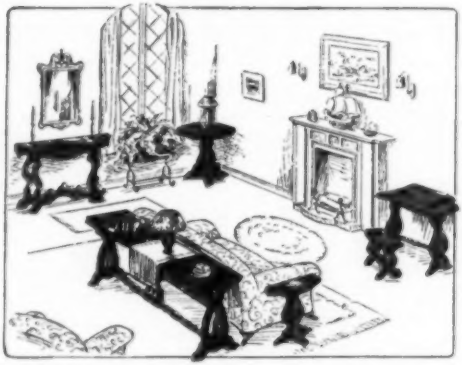

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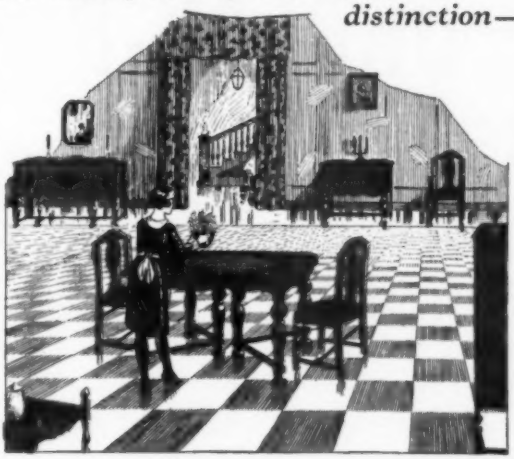

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With the Editor

THE ELEMENT that earns interest on money properly invested is one that is commanding added significance and importance to manufacturers today. It is the element of time. Bankers have always appreciated its value, and several years ago merchants began to give serious thought to the time element. Since then we have become more and more familiar with "turnover". Retail business establishments strive to obtain a more rapid rate of turnover on goods handled, and now the ability of a merchant is gauged largely by the rate of turnover he secures.

Progressive manufacturers also recognize the importance of the time element, and they are busy with problems involved in getting a more rapid turnover of money invested in the materials which enter into their manufactured products. Every production department has been called upon to contribute by completing its allotted part of the work in a shorter length of time.

In finishing departments, properly equipped and supplied with suitable materials, more days have been cut from manufacturing schedules than have been saved in all other departments of the average plant. This fact, together with new interest in colors and decorative effects, explains the predominating interest of factory executives in finishing departments today. Finishing schedules have been substantially reduced, but they are capable of being cut down still further through the introduction and use of improved equipment, supplies and material. It is by this means that manufacturers are going to get more rapid turnover and thereby increase their net profits despite cuts in selling prices to meet keen competition.

W. H. Rohr

Managing Editor

The Finished Surface a Sales Feature

Retail furniture sales manager reveals some interesting experiences in selling furniture to the trade, and offers several valued suggestions to furniture and finish manufacturers

By John R. Kingley

THE QUESTION as to what features of modern furniture tend mostly to increase sales, is an interesting one—and one with which every experienced furniture retailer has had his own experiences. To many, the surface finish is 75 percent of the matter, while to others, various other selling points seem to be of greater interest and importance to the public.

It is a fact, however, that the average city buyer is keen on surface and is inclined to be critical of the finish on the furniture she buys. This is especially true in New York, where the construction of furniture appears to be secondary to surface and where we often have some interesting experiences in this connection on the floor every day.

In New York City—and probably in Chicago and other of the larger cities—the factors that influence the buyer of furniture at retail may be graded in this manner:

Finish	70 percent
Sturdiness	10 percent
Style	10 percent
Price	10 percent

Now, these percentages evidently vary elsewhere, as I recently met an important retail furniture dealer, located in an Ohio city of 250,000, who declared that the factors governing the retail buyer, at least within his experience, rated as follows:

Finish	40 percent
Sturdiness	25 percent
Style	10 percent
Price	25 percent

Within my experience and those of many salesmen with whom I have been associated, finish is coming to be a dominant point in the selection of furniture by the public, and this is especially true of women buyers. The most common phrases which greet us on

the retail floor are: "I don't like that finish," or "That finish is just what I had in mind."

At that, the public knows very little concerning wood surfacing and finishing, but people do know what they like, and for this reason the retailer must bear in mind the all-important feature of finish, and display his goods accordingly. This factor has led us to a systematic treatment of the surfaces of our stocks and we go much further in this direction than we ever did before. As for defective or marred pieces, we either resurface them or we do not display them prominently, and when sales are made we plainly acknowledge any defects or marred places.

There is every evidence to the retail furniture dealer, that the manufacturer is aware of the all-important factor of finish; this is reflected strongly in the improvements in veneering and finishing that we see on every hand today.

A Clever Sales Idea

One of the largest piano houses in the country is using as a chief selling argument the fact that the surfaces of its instruments will reflect a ray of light without the least distortion, and the idea apparently appeals strongly to the buyer, whatever its intrinsic value may be. Salesmen for this piano maker place their pianos on the floor in such a manner that this test can be included in the demonstration.

Perhaps we are living in a superficial age. Perhaps the public is buying only on the basis of appearance—finish—b u t this is not necessarily the case, though it may seem to be so. The retail furniture buyer today wants luster where luster is intended, and this may be charged directly up to the finisher whose art has progressed so notably in recent years. In buying mahogany veneers today, cheap or costly, "the surface tells all," within the judgment of the average buyer, and the dealer who has well finished stocks and keeps them at their shiniest at all times, is going to profit by it.

Reconditioning Luster Surfaces

The retail furniture dealer is learning to recondition the surfaces of pieces injured, scratched or marred in store handling, and he is learning to refuse goods on which the finish isn't up to standard. I may say that very little of the goods we are getting now, leaves anything to be desired in this respect.

The reconditioning in the store or the store shop isn't always 100 percent efficient, but it fills the bill. And if any one doubts whether surface reconditioning pays the retailer, he can find plenty of evidence that it does.

Furniture surfaces are taken for granted by the public; not one buyer in 50 really knows anything about the technical side of it, and not one in 100 knows one surface from another. So true is this that the average furniture salesman—including the star man—knows very little about finishes and seldom feels the need of such knowledge. However, I, for one, am of the belief that if the finisher passed along to the retail salesman, more talking points on furniture finishes, it would be effort well spent. I say this for the reason that, since the public is so generally caught by finish and chooses so often on that basis, there ought to be plenty of information about finishes in the sales talk of furniture salesmen.

The greatest interest shown by the retail furniture buyer, in the finish, is in connection with the sale of parlor stuff. For example, tables are being sold today more often on the basis of the color, grain or luster of the surface, almost to the exclusion of style and general sturdiness of construction.

The American, furniture-buying public today is getting finishes, thanks to modern methods of manufacture, that they never got before. They are being educated up to the best in this connection and they will not take less. This goes for the cheap goods as well as the costly articles and suites. Wherever luster is due, buyers want the highest luster and the greatest perfection. Where a dull surface is the thing desired, people are quick to detect imperfections, because they look for them.

Buyers Interested in Care of Furniture

I have personally noticed in recent years that buyers of luster finished goods are keenly interested in knowing how the surface quality can be maintained after the goods are in service. Our polish sales have trebled within the past three years on this account.

"How can I keep the finish on this library table as it is now?" is a question very frequently asked in the store. We endeavor to explain how the surfaces of the furniture may be preserved with reasonable care, frequent cleansing and proper polishing.

I have mentioned that the surface of certain classes of furniture ranks 70 percent in the importance of selling factors, and in New York this is true. There are exceptions, I admit, where very fine stuff is on sale or where a special condition exists, especially in the case of antiques; but we can disregard this special market situation when we are considering the furniture-buying habits of the buying millions.

Surfaces Must Look New

Nearly every day we are asked: "I want a table like this, but this surface doesn't seem to be perfect. Can't you get me a fresh one out of stock—one that is lustrous and perfect?"

Of course, we explain that a perfect specimen will be delivered. We seldom if ever get a request for "a more sturdy article than the piece selected." I believe one might be able to sell a parlor chair with a cracked leg, provided the finish was smooth and perfect in luster.

The furniture s a l e s m a n is strong for good finishes. He will push the goods stronger when the finishing job is well done, because he knows that selling resistance will be less, and that more sales will be made. And this tendency isn't limited to the furniture field. In musical instruments and household appliances—a p p e a r a n c e, "finish," is considered the most effective selling point in retail circles.

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New Booklet on Equipment

A new booklet, No. 127, issued by Royal L. Vilas, New Haven, Conn., features in its 20 pages, attractive illustrations and descriptive literature of Vilas mixing tanks for finishing materials, non-leak oil gates, metal carrying trays, tray racks and spray screens —all useful and practical equipment for the modern finishing department.

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Graining With the Spray Gun

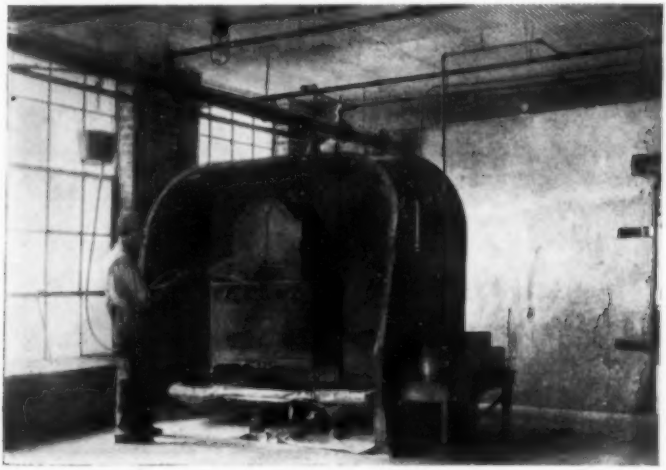
Practical wood finisher suggests methods of using spray gun for graining plain woods in imitation of expensive figured woods, when regular graining equipment is either not available or adaptable

By C. D. Wehmer

THERE is an old saying, that "It is hard to teach an old dog new tricks," and the saying is as true of some men as it is of animals. Some men never grow old, except in experience, because they are ever on the alert for new ideas. In this way they keep their minds from becoming "set," and they are always abreast of the times.

During the past few years, new ideas along lines of finishing have developed rapidly—so rapidly that the man who has not been able to keep his mind in a sufficiently plastic condition to be impressed with new developments, is having a hard time of it. Take for instance, the old-time finisher—whether of furniture or interior trim—who is still trying to grain with the graining tool, having been unable to adapt himself to the possibilities of the spray gun for doing this class of work.

It is only fair to admit that no method of graining gives the natural grain of the wood quite as perfectly as does the gelatine mat or roll, for these are made by taking an actual impression of pieces of the kind of wood to be imitated, and by which an exact reproduction of the natural



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grain is obtained. But there are many kinds of work which, because of the shape or position of the article to be grained, do not permit the use of the mat or roll; consequently the workman must rely on his skill as an artist to produce the grain desired.

Mahogany Piano Benches

Many factories make a specialty of piano stools and benches. Some of these are made of genuine walnut and mahogany; others are made of birch or maple, and stained or grained to match the more expensive woods. If the cheaper woods are merely stained to match the color of the better woods, the job is a comparatively easy one. But if it is desired to add some figure, to match that of the piano with which the stool or bench will go, the task then becomes one which requires skill and time.

The problem is how best to do this graining in the shortest possible time, and yet produce satisfactory results. To this end, the shading gun has come to the aid of the grainer in imitating such woods as stripe mahogany, circassian walnut, and crotch and burl veneer.

Birch and gum are the two best woods on which to make imitation walnut and mahogany, if only the color of these woods is to be imitated, and no graining is to be done. But if the wood to be matched is fancy figured, and the imitation is to be done by graining, then maple is the best wood to use because it has so little figure to be drawn out in conflict with the figure made by graining.

Figured Mahogany

Suppose it is a piano stool to be stained and grained to match a piano faced with figured mahogany. Any article that is of such shape and size that it can be readily dipped, is more quickly stained by that method than by any other, so we dip the stool in a light mahogany water stain. Whether or not the stain will raise fuzz on the wood, depends a good deal on how the stock has been sanded.

If the wood has been sanded with coarse sandpaper, some fuzz will be raised; if it has been sanded with fine paper, or finished by the tumbling process, there will be no trouble with fuzz. Where there is fuzz, it should be removed by rubbing with fine excelsior, or sea moss.

The next operation is graining. This is done with the shading gun, using either a dark water stain or an oil stain for the purpose. If the wood to be imitated is stripe mahogany, the operator uses the gun to put a few fine stripes in the legs; then he stripes the tops to match the genuine wood. If the figure to be imitated is more intricate, the operator studies it carefully and governs himself accordingly. Usually a few fine stripes will be sufficient for the legs, but in matching the figure more care with the tops is required.

Skillful Workmanship

When the operator becomes skillful, the job of imitating fancy woods becomes an easy one. Of course, it takes time to become an expert at graining with the gun. However, the time is well spent if the finisher has any natural artistic ability to develop. Spray guns are now so much improved over what they were a few years ago, and there are so many different kinds and sizes,

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Imitating Joint Lines

Take, for instance, a piano bench that is to be grained in imitation of butt or crotch veneer. There is one thing that cannot very well be done to perfection, and that is, show the joint in the veneer. Still, in the hands of an expert, it can be imitated so closely that only an experienced veneer man can detect it as an imitation, and then only after close examination.

Of course, in real veneer work the less visible the joint between pieces of veneer, the better. But there are very few veneer matches so perfectly made that the joints are not clearly visible, consequently a slight line, showing where the joint would be in real veneer, is quite all right in the imitation. This can be shown by making a very fine scratch with some sharp tool such as a chisel, making the scratch before the surface is stained.

Using a Pattern

Unless the operator is well acquainted with the markings of the kind of veneer he wishes to imitate, he should have before him a panel of matched veneer while working. Here, as elsewhere, it is difficult to give specific instructions as to the method of procedure. Remember, however, that any of the marks which cross the line of the joint should be made with one stroke of the gun, instead of trying to work either to or from the line of the joint.

The above suggestions are for graining the top of the bench only. The under parts may be grained in accordance with the suggestions for making imitation stripe mahogany.

After the more prominent marks have been put on the wood, marks in imitation of the pores can be applied by holding the gun far enough from the wood to allow only a spray to fall on the surface, and then going over the surface quickly with a wide blending brush and working out the spray drops before they have time to dry. The blender must be worked from end to end of the surface. When spray drops fall they are circular, but if caught with the blender before they become dry, they will work out long like the natural pores in the wood.

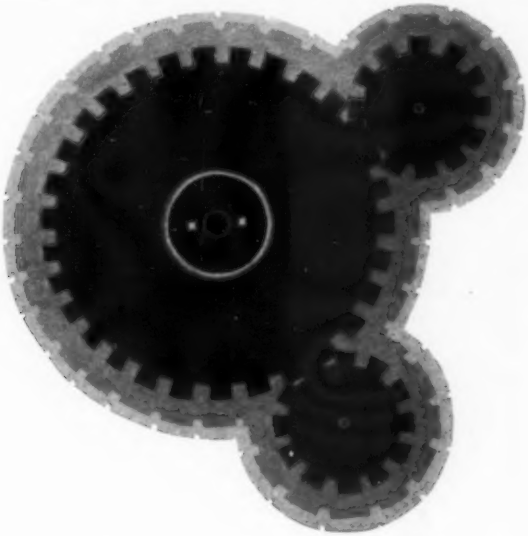
Interior Woodwork

For graining interior woodwork, especially if it is old woodwork, or if the wood has considerable natural grain which must be hidden, it becomes necessary to apply a coat of ground color; then use an oil stain for graining.

If the wood is plain gum, and a dark finish is not desired, first give the wood a coat of white shellac, and when dry, sandpaper the surface smooth. For graining, use an oil stain that will not lift with the varnish. If the wood is to be finished in imitation of walnut, the first coat of varnish should be tinted slightly with asphaltum varnish; if mahogany, it may be tinted with any of the mahogany oil-soluble colors, or it may be coated with one of the mahogany-colored varnishes on the market.

A Medium Dark Finish

If a medium dark finish is desired, the finisher may find it necessary to first stain the wood to avoid putting too much color in the varnish. If the stain draws out the natural grain of



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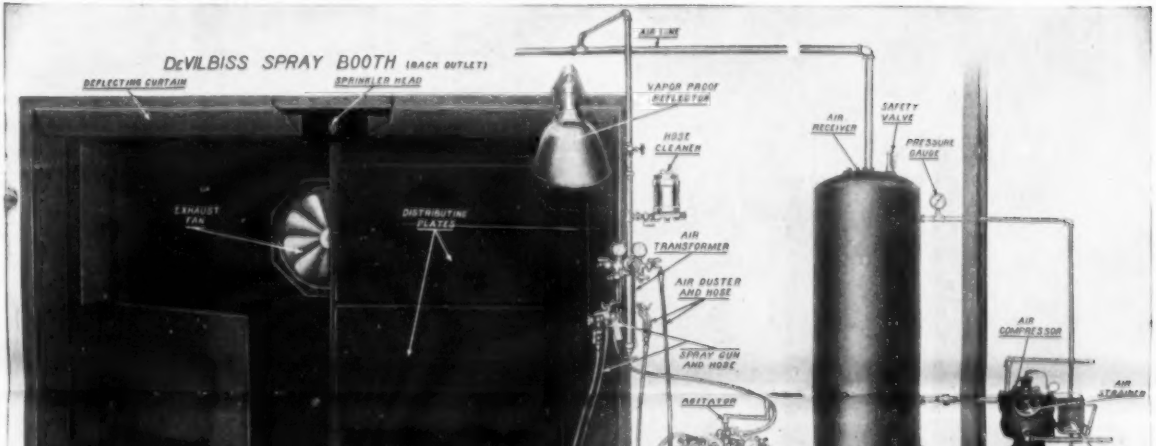

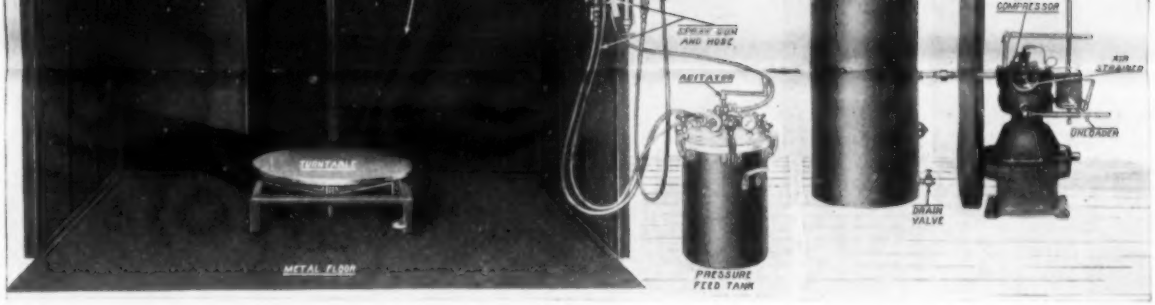

SOLVING the important problems of the finishing room, for well over fifteen years, in leading manufacturing plants the world over—plants of every size and character, producing every type of product—is the pre-eminent performance background of the DeVilbiss Spray-finishing System.

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Foreword About the New Rubbing Machine

While not ready at this time to make a detailed announcement of the new mechanical, hand-holding rubbing machine, rumors of which have occasioned so much comment in various finishing rooms, its manufacturer feels compelled to mention generally to the trade:

Within the past few months tests have been conducted with the machine in certain factories on curved and irregular surfaces. These tests were carried on with more or less secrecy, not because publicity was feared, but because the manufacturer was awaiting final advices from the U. S. Patent Office that all its protective claims or patents covering this new principle, had been allowed. Now that this has been received the manufacturer is conducting a series of final tests in big production plants where the machine will be operated under severe eight-hour-continuous-service. At the conclusion of these tests it is expected that the formal announcement and introduction of this remarkable time and labor saving device will be made to the public.

The rubbing and polishing machine should be in production in about 60 to 90 days, but the only description available for publication at this time is as follows:

The machine is light in weight and can be easily handled.

Its principle of operation is entirely different from the other mechanical rubbing devices.

It is speedier than anything else ever used successfully for mechanical rubbing. (Some foremen claim it is faster than their big stroke machines.)

It will surprise the users with its ability to properly rub and polish almost any kind of surface.

Curved and irregular surfaces hold no terrors for this little machine.

Mouldings, cabinets, cash registers, desks, case goods, table tops, many types of chairs, auto bodies, grand piano cases and the like, can be handled with equal ease.

In reality, this machine holds greater promise of solving the problems of rubbing and polishing lacquered surfaces than anything else introduced to date.

It will reduce rubbing and polishing costs of both lacquer and varnish, regardless of whether these costs are computed against hand (or manual rubbing) or rubbing with any of the other mechanical devices which have been on the market.

This is the machine referred to by a "Foreman Finisher" on page 60, December 1926 issue of INDUSTRIAL FINISHING. He could not divulge its name, having been previously sworn to secrecy.

A forthcoming issue of INDUSTRIAL FINISHING will contain other information about this new machine. In the meantime, please remember when this machine is offered to you men of the finishing rooms (either automobile or furniture) it will have been perfected and you can give it the **third degree** in strenuous tests.

EDITOR'S NOTE: The manufacturer of the machine above referred to, prefers that his name and address, as well as his policy of marketing the machine, not be divulged at this time. Those desiring advance, or confidential information, may address their communications to "THE MANUFACTURER OF THE NEW RUBBING MACHINE", care INDUSTRIAL FINISHING and we will promptly forward them.

Editor.

[Advertisement]

the wood sufficiently to conflict with the graining, it may be necessary to avoid attempting any new markings, and merely follow the lines of the natural figure in the wood, so as to render them more prominent.

After the finisher has mastered the fundamentals of graining with the spray gun, he will be able to go ahead on his own initiative and do almost any kind of graining.

Lacquering Over Old Paint and Varnish

The experience of most finishers, who have attempted to spray lacquer enamels over articles previously finished in paint and varnish, has been very unsatisfactory from the standpoint that one could never tell in advance what was going to happen. This condition has been very unsatisfactory because, after the old finish had been sanded down and prepared in the best known manner to receive the lacquer coat or coats and thereby turn out a quick, good looking job, the old paint or varnish lifted or raised from the surface, meaning that the entire finish had to be removed down to the metal or wood.

In some cases it has been found that lacquer can be applied over paint and varnish, but the final result is so uncertain that one can not figure in advance what will happen. This condition has now been entirely removed, it is claimed, through the use of a sanding buffer coat.

The old finish is first given a dry, coarse sanding in the usual manner and then the buffer coat is sprayed on. This coat dries to the touch in about one hour, and about two hours later it can be dry or wet sanded to a nice smooth finish. When the lacquer coats are applied over this sealer, the final job looks just as good as a job which has been built up in lacquer completely.

This product is used very successfully in the automobile refinishing trade, on jobs where the owners or used-car dealers do not wish to incur the expense of burning off the old finish. Several furniture manufacturers are also using this material in refinishing dead stock into new lacquer enamel finishes, which move out rapidly.—News.

Zapon Main Offices Moved to Factory

The Zapon Co. announces the removal of its General and Sales Offices from 247 Park Ave., New York City, to its plant at Stamford, Conn., where a large administration office building has recently been constructed.

The office and warehouse of the Zapon Co. at 547 Greenwich St., New York City, in charge of Mr. H. W. McGovern, will continue to serve the metal, doll, toy and composition industries in the Metropolitan District.

A suite of offices will be maintained at 247 Park Ave., New York City, for the convenience of the trade.

Jones-Dabney Co. Announcement

The Jones-Dabney Co. of Louisville, Ky., announces that Messrs. Hubbard, Hansen and McNealy will now represent that Company in Grand Rapids and the Michigan Furniture territory, with office, warehouse and studio at No. 540 Monroe St., Grand Rapids.

All three of these men are not only thoroughly conversant with the requirements of the furniture manufacturers, but are well known to the trade in the Michigan territory.

The Jones-Dabney Co. has secured a Finish Designer who will work in their studio not only as a consultant, but actually finishing up suites embodying the latest designs and ideas for any furniture manufacturer.

Useful for Cleaning and Finishing Small Articles

Tumbling as a Finishing Process

Calling attention to the variety of uses for which the tumbling operation is employed and giving details about the construction, sizes and speeds of typical tumbling barrels

By Donald A. Hampson

SPEAK of "tumbling" to the average man, and he thinks immediately of a cleaning process, such as is used in foundries for removing the sand from castings. That might be considered a finishing process—in fact it is, so far as the foundry's output is concerned—but it is not one that puts the product in shape for the market.

Tumbling is a process that is applicable to more kinds of finishing than one would suppose. Where it is applicable, it is a low-cost process that may be done acceptably by common labor. Some lines of work in which the tumbling barrel is used successfully will be mentioned in the following paragraphs.

Fig. 1—A cylindrical tumbling barrel 3x3 ft. inside measure. Note smaller box-shaped tumbler in lower left-hand corner.

Display fixtures that have a natural wood finish are tumbled in wooden barrels, in contact with vegetable wax. The wax is put in as small lumps, or in the form of wax shavings. It is the only thing placed in the barrel with the wooden articles. The wood pieces are fairly well smoothed to begin with; tumbling still further smooths them up, and the wax imparts a clear, somewhat polished surface appearance, which reveals the grain of the wood to good advantage.

Vegetable wax is applied to various irregular-shaped articles in this way. The coating serves as a moisture proofing agent, as well as a finish. The degree of polish obtained by tumbling is not as high as is possible where turned pieces are wax-polished in a lathe, but it possesses enough "shine" to make the goods attractive on the sales counter. Articles so coated bear a strong resemblance to those finished in cellulose lacquer; this makes it possible for certain factories not equipped with spray guns, to compete in this field.

The illustration, Fig. 1, shows a wood tumbling barrel that is used for beech blocks. These blocks form the bases for animal traps of two sizes, the largest of which is 6-in. long. An eastern firm markets them in competition with a foreign product, depending

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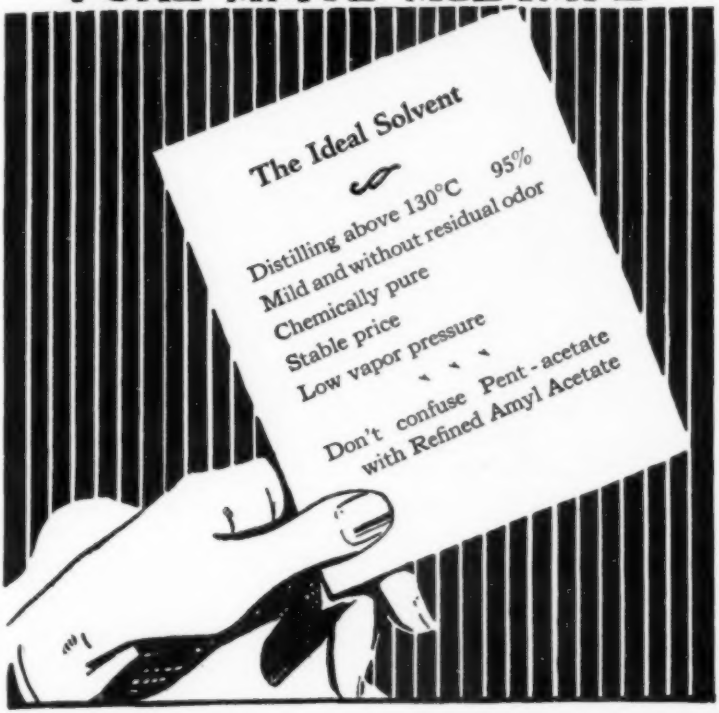

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upon the very evident superior material and workmanship to offset the difference in price.

Typical Tumbling Barrels

The tumbling barrel measures 3-ft. each way inside. It is loaded as full as convenient for closing the door and for quick loading, which is three-fourths of the way up. Half an hour's run is sufficient. In this case, the tumbling takes the place of sanding.

Fig. 2—A box-shaped tumbler partitioned lengthwise through the center, is used for tumbling mouse-trap springs.

The blocks are put in just as they come from the double surfacer and saws. The object in tumbling is to smooth them all over, as well as to remove the sharp or ragged edges left by the cut-off saw.

Alongside this large tumbler is a smaller one, which is merely a soap box that revolves on a 1-in. shaft, run through it longitudinally. In this box are loaded springs made of .042-in. wire, coiled and formed for the same traps mentioned above. The object of tumbling them is to remove oil left by the automatic spring-making machine, and to brighten them up.

Several thousand springs go in the box at a charge. Strange to say, these springs do not tangle up under a certain time limit. A partition to divide the 9x15x18-in. box in two parts is necessary, however, to prevent tangling, see Fig. 2. A shovelful of wood shavings is put in with each charge of springs; this causes them to come out dry and bright.

The matter of smoothing or polishing is carried still further in some cases, notably where the shape of the piece is too irregular to permit of belt or lathe polishing. Such jobs are handled successfully by putting abrasives in the barrel, to make contact with the charge as it is tumbled. This abrasive will find its way into all the irregular parts, giving them a "caressing" that smooths as well as the finest of sandpaper. Owing to the cost of the abrasive, which may be garnet or artificial, the barrels must be made commercially tight.

Tumbling Barrel Speeds

Success in wood tumbling depends upon a speed and a loading practice worked out specifically for each job. It is evident that too high a speed will tend to crowd the articles against the shell of the tumbler, by centrifugal force. A slower speed allows the pieces to be carried up only part way; then they tumble back toward the bottom and are carried upward again. At too slow a speed, or with heavy pieces, the fall is too violent, and edges may be ruinously battered. One remedy for this is to use a fuller charge; another is to put in more shavings or other material for cushioning purposes.

Wooden barrels are superior for wood products, although metal barrels with wooden linings are

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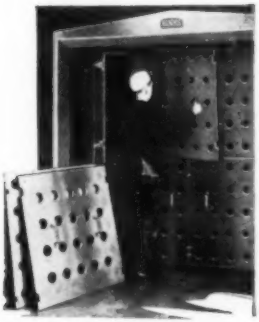

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satisfactory, also. Long spindles may be successfully polished or smoothed in tumbling barrels, but the longitudinal space should be restricted so they cannot become blocked crosswise. Other tricks of loading are also employed so the job may be done quite easily, once the proper method is settled. Since wooden barrels are not expensive to make, a special shape or size is sometimes the simplest and most satisfactory.

Metal parts lend themselves to the tumbling process in many ways. Small wire and stamped sheet-metal parts may be freed from burrs and sharp edges in this way; they may be polished or burnished, or they may be covered with a copper or similar solution. A high polish is imparted to small steel articles by tumbling them in contact with steel balls, and in a barrel tight enough to retain liquids such as soapy water.

It is seldom advantageous (outside of the foundry) to tumble large and small pieces in the charge at one time. If fillers are required, they may be secured by using a charge of stampings or shavings, or stars, or leather bits —depending upon what is available and what work is to be done. Small charges can be successfully run in large barrels which are divided into compartments by partitions of wood or steel—a barrel head will often do—the partitions being positioned to suit.

For Cleaning and Smoothing

Another phase of tumbling is the possibility of making it an operation just preceding a coating job, employing the tumbler to clean all the burrs or scale or ragged edges off, before the articles go to the sprayers or the dip tanks. Tumbling has been used as a wholesale un-surfacing process, both for metal and wood parts, where an unsatisfactory coating must be removed to salvage the goods with a new coating applied to the raw material, or to the undercoat. For this work, an abrasive is included in the charge.

The automobile and furniture manufacturers probably are not interested in tumbling, but the man whose output includes small or medium-size pieces of wood or metal will find that a tumbling barrel will do, in an inexpensive way, many odd surfacing jobs that have been giving him a bit of concern.

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New Book on Automobile Finishing

Murphy Varnish Co. of Newark, N. J., has just published a new copyrighted handbook which describes in detail the use of pyroxylin lacquer materials and systems in the painting of automobiles. A wealth of practical information is revealed in its 15 pages. The book will be of value to every automobile paint shop.

New Book of Paint, Varnish and Lacquer Words

A new copyrighted book of 52 pages, containing technical words and terms used in the Paint, Varnish and Lacquer Industry, has been published by Paint, Oil and Chemical Review, Chicago, Ill. Starting with "absolute" and ending with "zinc yellow," the words are in alphabetical order, and following each one is a printed definition of the word's accepted meaning as it is used for this industry.

For example, after the word "one-half second nitrocellulose," the definition reads "Nitrocellulose which, made into a specified solution, allows a 5/16-in. steel ball to sink 10-in. in one-half second; the least viscous variety in use and the one used for pigmented brushing lacquers."

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Finishers, read and remember these facts!

Why Viscosity Tests Are Important—II

Last installment of a two-part article which explains clearly what is meant by viscosity of paints, varnishes and lacquers; what to make tests with, and how to judge the results shown by the tests

By W. H. Martindale

VISCOSITY should not be confused with specific gravity. Viscosity is the resistance offered to flowing; specific gravity is an expression of the relative weight of a given volume of the material, in question, as compared to the weight of the same volume of pure water at a definite temperature.

It should be thoroughly understood that the consistency, "body in the can," or viscosity of a paint, varnish or lacquer has nothing to do, necessarily, with its Baume reading, or specific gravity. The viscosity and specific gravity of a liquid represent two qualities that are as widely different as daylight and darkness, although it sometimes happens that there may be an apparent connection between them.

Tests for viscosity can be made with any one of several viscosimeters on the market today. The most common types measure the viscosity by noting the time required for a given volume of the liquid, at a given temperature, to flow through a small opening in the bottom of the cup in which the liquid is placed. Much the same results can be obtained, in a crude way, by punching a small hole in the bottom of a tin can and noting how long it takes a given volume of the liquid to flow through the opening, at a definite temperature.

The great drawback to this type of instrument is the danger of the size of the hole becoming larger or smaller, due to wear, or to small particles of paint, varnish or lacquer becoming lodged in the hole. The opening must be of the same size for all comparative tests, or the results will be of no value. Likewise the temperature must be the same, for a change in temperature affects the viscosity reading of a liquid, materially. The more viscous the liquid, the longer it will take a given volume to run through a hole of a given size.

Variety of Viscosimeters

Other viscosimeters are of the so-called torsion type. Instead of measuring the time required for a certain volume of the liquid to flow through a small hole, they measure the resistance offered by the liquid to the twisting or turning of a spindle suspended in the liquid. The more viscous the material, the greater the resistance offered to the turning of the spindle. This provides a means for reading the comparative viscosity of two or more materials,

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when tested on the same machine at the same temperature.

A simple and very practical method of obtaining a relative reading of the viscosity, or consistency of a clear finishing material, is to note the rapidity with which a small bubble of air rises through a small column of liquid, as compared with the time required for a bubble of the same size to rise through a column, of the same height and diameter, of a known standard solution. Sometimes sugar solutions and other liquids are used for these standards, but it is a common practice to use a varnish of known working qualities and compare with it other varnishes intended for the same use.

Small glass tubes, about 6-in. long and of small internal diameter, are used for making this test. The tubes must be of exactly the same internal diameter, and the temperature of the two liquids being tested must be the same. The known varnish is poured into one of the tubes up to about ½-in. of the top. The other tube is filled to the same height with the varnish to be tested.

Corks are then inserted in the tubes, so the distance between the top of the varnish and the bottom of the cork is approximately the same in each tube. They are then held by one hand in a vertical position, side by side, and quickly inverted. By watching the air bubbles in the two tubes, it is easy to tell which liquid is of the heavier consistency. Quite a little knack is required in filling and inverting the tubes, so as to get accurate results, but this skill is acquired with a little practice.

There is yet another type of instrument used for measuring the viscosity of quite viscous lacquers and similar materials. A cylinder is filled, to a definite height, with the liquid to be tested and the temperature is carefully noted. A small steel ball is then released at the top film of liquid and the time is noted as to when it reaches the bottom of the cylinder. By having the temperature and the height of the column of liquid uniform, a comparative reading of the viscosity of two or more materials can be obtained, so long as the same steel ball is used.

Comparative Readings

The viscosity reading, as given on one type of viscosimeter, has no relation to the reading given by another, although it is possible to calculate the reading on any instrument to an absolute basis by which it can be compared to the reading on any other viscosimeter. It should be noted in particular that readings on two instruments of the same make and design will not necessarily be the same, due to slight differences in the size of the opening, the volume of the cup, or to other small variations.

From this it will be seen that the name of the instrument used in making a viscosity test, as well as the temperature at which the test is made, must be mentioned whenever a viscosity reading is given. It is well, also, for the purchaser to standardize his viscosimeter with that used by the firm that supplies his finishing materials, so both the purchaser and the seller will readily understand the relation between the two instruments.

A paint, enamel, japan, varnish or lacquer should be used at the same viscosity or consistency at all times on similar work, to get

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uniform results. If it is used heavier at one time than another, it will not flow or level out as it should and the drying is likely to be impaired, because of the difference in the thickness of the film on the work. If the material is used too thin, it will not hide or cover the work properly and will not give the desired body or luster to the finished surface.

Hydrometer Readings

While tests can be made on a viscosimeter to maintain a given material at a standard viscosity in the finishing department, it has been found easier and accurate enough for ordinary practical purposes to make a hydrometer reading, or a test for specific gravity. The proper reading for best results on the work, should be ascertained by reducing the material in various ways until it works properly. Then take the hydrometer reading at a given temperature. After this, so long as the same finishing material and the same reducer are used, quite satisfactory results can be obtained by keeping the hydrometer reading uniform at the temperature decided upon as standard.

As stated before, this hydrometer reading does not indicate the viscosity of the finishing material, but so long as the same material and the same reducer are used, the viscosity probably will not vary greatly, and by reducing to a certain hydrometer reading, approximately the same viscosity will be maintained. However, this holds true in a general way only, and for special purposes both the viscosity and the specific gravity should be taken.

Finishing Toy Boats

Recently I noticed a customer of mine using redwood lumber in the manufacture of toy boats. Previously he had been using hard pine with good results, but now he is able to obtain the redwood at about one-third the price of pine.

With the change in lumber his finishing troubles commenced. He had two carloads of redwood lumber all shaped out for his boats. His first experience was that the lumber was very spongy and would drink in anything he put on the surface—varnish, lacquer or oil-enamels.

After investigating the situation, I suggested he use paste-wood filler and buff the filler with a buffing wheel instead of wiping it off. He did this and thereby stopped all shrinkage of the succeeding coats.

The schedule for finishing the toy boats made of redwood is as follows:

1—Apply paste-wood filler (light oak).

2—Buff on buffing wheel when filler is about set. (Let filler dry 24 hours before coating.)

3—Coat with clear lacquer sealer (sprayed).

4—Apply coat of lacquer enamel by spraying.

5—Put on coat of waterproof varnish by spraying.

To obtain a two-color effect, spray part of sides with colored lacquer and then dip to the water line in another color of dipping lacquer.—Joseph Cowan.

Hildreth Main Offices Moved to Factory

On and after May 1st, the Hildreth Varnish Co., in order to further improve their service to customers, are consolidating the main offices, now located at 90 West St., New York, with the factory, at 77 North 12th St., Brooklyn, N. Y.

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Samuel S. Harkavy

Colorimetry in Modern Wood Finishing

Color chemist of Heller & Merz Co. calls attention to the importance of knowing what water soluble stains are used in wood finishing, and gives a number of formulas for making specific colors and shades

By Samuel S. Harkavy

ANILINE colors chief uses in the industrial finishing trade, are in the manufacture of water-soluble wood stains. The colors used in the production of water soluble stains are dyes of the acid and basic group. This article tends only to discuss the former.

The popularity of acid colors in the making of water-soluble stains is due to:

1—Its ready solubility in water.

2—Its fairly fast to light properties, and

3—Its money value. The shades most frequently made with acid dyes are mahoganies, oaks, walnuts and other various brown shades.

By using the following colors, the above mentioned shades are easily produced: nigrosine blue shade, orange Y, methanil yellow and azo rubine. These colors are all fairly fast to light, having fine penetration on all kinds of wood. For instance, suppose a chocolate wood stain is needed. By using the above colors, the finisher may easily produce the desired shade.

Chocolate Shade Stain

14-oz. nigrosine blue shade.
10-oz. metanil yellow.
8-oz. orange Y.

The above mentioned colors, used in the formula can be easily dissolved by adding them to ten gallons of hot water.

If a mahogany shade is desired, the following formula can be employed:

15-oz. nigrosine blue shade.
12-oz. orange Y.
4-oz. azo rubine.

The above mentioned colors may be added to ten gallons of hot water and then applied by brush. By varying these colors, practically any brown shade can be made.

Some finishers would like to make some fairly fast-to-light brilliant shades, for example, blue, greens, and various shades of red such as pinks and deep scarlets. The following colors can be used in making green and blue shades: patent blue, acid violet (4B), tartrazine acid, blue-black and wool green.

In the production of the red shades, azo rubine, croceine scarlet, orange Y and brilliant croceine are recommended. For blue

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shades, the following formulas are recommended:

Blue of Redder Type
1-lb. acid violet 4B.
4½-oz. patent blue.

Blue of Greener Type
3-lbs. patent blue.

The above poundages of color can be added to the usual ten gallons of hot water and then be applied by brush. For greens, the following formulas are of good value:

Brilliant Bright Green
1-lb., 4-oz. patent blue.
8-oz. tartrazine.

Dull Blue Green
1-lb., 10-oz. wool green.
3-oz. tartrazine.
1-oz. acid blue black.

The above formulas are used in the same manner as the preceding ones. For pinks and scarlets the following formulas can be used:

Light Brilliant Pink
8-oz. croceine scarlet.
1½-oz. orange Y.

Brilliant Pink (Blue Shade)
8-oz. azo rubine.
1-oz. croceine scarlet.

Deep Red
2-lbs. croceine scarlet.
1-lb., 2-oz. azo rubine.
8-oz. orange Y.

The above formulas are used in the same manner as aforementioned. If pinks of a more brilliant nature are wanted, eosine, phloxine and erythrosine are recommended.

The following colors are recommended for blacks and grays:

Blue Black
4-lbs. acid blue-black.

Jet Black
5-lbs. nigrosine blue shade or
3½-lbs. acid blue-black with
1¼-lbs. orange Y.

Blue Grays
10-oz. acid blue-black.

Dull Gray
9-oz. nigrosine blue shade.
1-oz. orange Y.

The above formula can be used in the same fashion as the others. To all the above formulas one or two gallons of denatured alcohol may be added to increase their powers of penetration. The colors can then be topped with the usual shellac or "dope" finish.

On the whole the acid colors play a very important part in the industrial finisher's business.

Note by Editor: The specific trade names or brands and grades of any materials mentioned in this article will be furnished to any one interested, by the author.

Lacquered "Art Pianos"

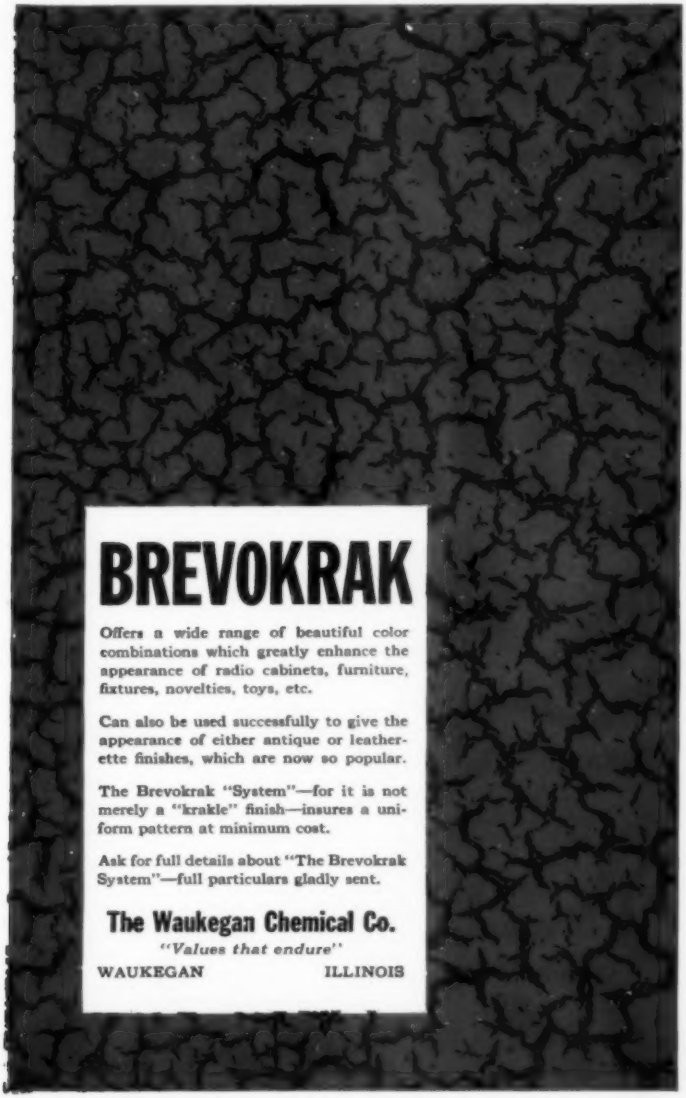
For some time I have been calling on a piano manufacturer in my territory, trying to induce him to use lacquer as a finish on some of his piano cases. However, he always seemed to have the idea that lacquer was too expensive.

On my last trip, I was taken into the finishing room and, to my surprise, I saw pianos finished in lacquer, and they certainly did look fine. The manufacturer is so well pleased with them that he now calls this particular line of pianos "Art Pianos."

The schedule for finishing the art pianos is as follows:

1. Water stain. Air dry 24 hours.
2. Wash coat shellac (6 parts alcohol to 1 part shellac, 3½-lb. cut).
3. Sandpapered.
4. Filled and allowed to stand 36 hours.
5. Filled again. (Double filling.)
6. Coat of shellac (reduced 2 parts alcohol to 1 of shellac, 3½-lb. cut).
7. Colors blended or matched.
8. Shaded with Van Dyke brown in japan, reduced with turpentine. (Spray-machine shading.) Dry 24 hours.
9. Spray stocky coat clear lacquer. Dry 24 hours.
10. Rub down with fine waterproof sandpaper and water.
11. Polished with powdered rottenstone and rubbing oil.
12. Wipe dry.

This schedule produced a very attractive finish.—Joseph Cowan.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Low-Cost Finish for Machines

Calling attention to finish requirements for certain kinds of machinery and describing a one-coat "meter enamel" finish which has proved to be very effective and economical

By Donald A. Hampson

THE question which C. C. M. D. asked in the March issue of INDUSTRIAL FINISHING, page 70, might be answered by telling how one concern is doing the same work, namely, finishing paper cutters. The problem is the same as confronts other makers of machinery and so has a general as well as a specific application. The company's present practice is one that succeeded a number of others and it might be called a change with the times, as applied to their own conditions.

The company I have in mind is now using "meter enamel," which is applied with a brush, and dries in the air. It is the only coat the castings are given.

A Finishing Problem

Coating machinery is not the simplest finishing job that might be named. If the machine can be, and is, dipped, the coating runs over finished (machined) surfaces, adheres to shafts, fills oil holes, and covers parts that require no finish, but which simply uses up much valuable material. If the machine is sprayed, much the same thing occurs, although the coating is applied only to visible surfaces, and what strikes upon machined surfaces doesn't form as heavy a covering as is made by dipping.

Brushing is a method that enables one to put the finish only where it is wanted, although the skill of the workman is an important factor, and it is never possible to avoid tracing a faint streak of paint on adjacent machined surfaces, if a thorough job of covering is done.

There is less cleaning up and scraping off with a brush job than with the two other methods. Probably we all consider this hand brush method obsolete, but there are numerous instances where the *total* time of finishing by it is considerably less than by the other methods—when the cleaning and running-in time is added to that of coating, as it properly should be. A comparison of the total time spent under different methods would be a revelation in many plants.

Some classes of machinery may be sprayed or dipped, regardless of consequences. Agriculture machinery is an example of this; railroad-car trucks is another. When power is applied, the bridged film is broken at the joints where moving parts were painted, but the appearance does not count particularly from that time on. The same can not be said of paper cutters, which are machines more in the precision class and of a kind where appearance counts.

Exacting Requirements

With a paper cutter, there are sliding surfaces which must be free from paints, both for ac-

curacy and for easy running. Many cutters are operated by hand power. A razor-sharp knife is used for the cut, and this knife must be free from coatings, as well as the part to which it is attached; otherwise the cut will be inaccurate.

The members which guide and clamp the pile of paper must not be smeared or stuck up with any paint coating, for here again the clean machined faces are depended upon. Taken all together, a paper cutter is a good example of a machine which must be attractively painted—in spots. And small cutters are sold on an extremely close margin.

An Expensive Method

The usual way of finishing machinery is to give the castings a coat of priming paint; then put on two or more coats of machine filler; rub the filler down to a smooth surface, and finally apply a coat of either dull or gloss paint. Printing presses, lathes, planers, engines, etc., are finished in this way.

Any holes that brush coats of filler will not eliminate are gone over with paste filler applied with a putty knife. Some kinds of machines that are intended for office use have been finished in this way, followed by a coat of varnish to impart a hard, permanently glossy surface.

This method is too expensive for machines that are sold on a small-profit basis. Japans and enamels have taken the place of multi-coats. Baking has been resorted to, to get greater hardness with gloss.

The plant under consideration makes paper cutters more to catch other orders than from a desire to compete in an overcrowded field. The quantities run through are one-dozen and two-dozen lots. The firm has no baking facilities, hence it must rely upon air drying finishes.

A One-Coat Job

The present practice, which is the cheapest yet, is to give the machines one coat of meter enamel, after they are all done. This is a moderate gloss enamel —not of an expensive grade— that adheres well and covers thoroughly, as witness its use in the coating of gas meters and other meters having different kinds of metal exteriors, some of them quite flexible.

On these paper cutters this enamel must cover bright steel parts, as well as castings, and show solid black over the former —fairly difficult requirements to meet. Brushing over bright steel faces is very apt to leave a brownish effect, hence the solid coverage of this enamel was considered a fortunate discovery.

The machines are painted after they are completely assembled. They are allowed to stand three days before touching, for, although the finish hardens over night, this period of time has been found to be the minimum over which a sufficient set is obtained to avoid dulling the gloss while cleaning up and packing. What little material has overrun is removed with a scraper, and surfaces requiring a brightened metal finish are rubbed with emery cloth at the same time, preparatory to the anti-rust application for storage safety.

Paint removers are not satisfactory for such jobs. Their ability to remove or dull coatings

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Followed by Gravarco 1009 Clear Lacquer and Gravarco 1022 Flat Lacquer, this easy method is making prominent converts everywhere.

The resulting finish cannot be excelled for durability and evenness of tone, and is particularly useful in obtaining soft antique effects. Write for full details—and tell us your other finishing problems.

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that should remain untouched, and the difficulty of localizing their application—these factors are against them.

Proper Surfaces Demanded

The paper cutter manufacturers have found the one-coat method satisfactory. Having a thorough understanding with the foundry, they accept any surface blemishes that do not show, but reject all castings that have depressions in the parts that show. As a result there are no holes to fill up with filler; these would show up as dull spots against a generally glossy surface. The castings are well smoothed off, and then the single coating answers nicely.

One way of finishing machines is to coat all the parts before assembling. Then they are easily cleaned. But the objection comes in the damage that may result during assembly and trial operation. With office machines, for instance, it is possible to use a casing which is dipped, and to insert the works from the bottom as a separate unit. This makes for the most economical finishing methods.

From Discord to Harmony

Finishing Management—A Problem

What occured in a typical factory to cause dissension between the finishing foreman and the superintendent, and how the trouble was settled

By E. F. Werner

IN NEARLY all organizations the higher officials, such as the president and vice-president, are mostly concerned with the financial and sales plans. The actual production problems are left to the manager or superintendent.

As a rule, the superintendent's duties include the entire supervision of manufacturing, purchasing of supplies and equipment, dealing with labor, etc. He can spend very little time in any one particular department. This condition necessitates departmental foremen for information and data on processes and experiments.

Unless there is the closest cooperation between the superintendent and the foremen, much information and material that could be employed for the best interests of the company and the men themselves, are often discarded, resulting in retrogression and disorganization of the company.

The incidents related here are typical of many manufacturing establishments, and were re-

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It is a good rule to take nothing for granted, but to investigate, and this we invite you to do. Use the coupon and send for sample panels to test Varnitro against — Muriatic Acid, Boiling Water, Live Steam, Hammering, Hot Dishes, Alcohol, Vinegar, Printing, etc.

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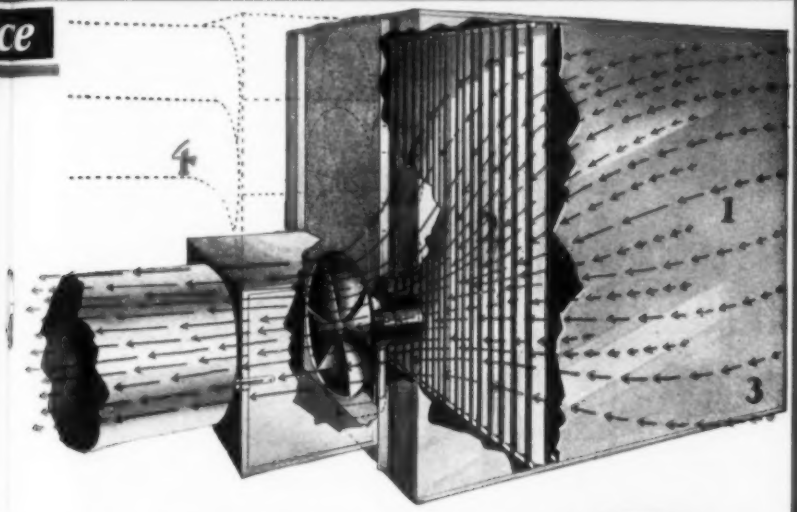

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vealed after a serious heart to heart talk between the superintendent and foreman finisher of an uptodate plant, manufacturing novelty furniture. The superintendent had been on the job for more than a year, and had discovered that the foreman was thoroughly informed in some phases of the work, but not entirely familiar with other parts of it. As a result, delays occurred while experiments were made.

From time to time the superintendent would bring in men, either plant executives or salesmen from the various companies from which they purchased materials, and occasionally a man from the laboratories, or a practical expert of these companies. The reception given was not at all cordial, and a showdown was called for. The foreman stated his reasons for "being on his high horse" and the superintendent stated the points he found objectionable. It was finally decided to write the grievances down and discuss them thoroughly.

The Foreman's Grievances

1—Objection to the superintendent standing around when tests were being made or when finishers were attempting to match sample colors that were sent in. The foreman stated that this made the men nervous and caused them to consume more time than they ordinarily would.

The answer to this being, that the superintendent was not a practical finisher, and, therefore, there need be no fear that some particular trade secret of the foreman would be stolen. However, when he got together with executives of other plants or visited these plants, it would enable him to appreciate information received, and thereby help the foreman with such information. It would also permit him to read the excellent articles written in trade journals in a more intelligent manner, and thus benefit the entire organization.

A narrow spray booth in which small articles are finished.

2. Objection to the men stopping the superintendent or going to his office during the noon hour for the purpose of speaking to him. This objection was quickly explained. The men, having confidence in the superintendent, would ask permission to see him at noon hour or after working hours in order to ask advice on matters usually personal, such as the paying of taxes, citizen papers and the like.

The foreman said such practices had a tendency to lower his own standing in the eyes of his men. Since nothing pertaining to the work or working conditions was discussed, just the op-

posite effect was produced, because the men, believing in the integrity of their superintendent, were more certain of getting fairer treatment from the foreman, and so harmony was actually increased instead of decreased.

3—The foreman objected to being "sampled to death." This will be answered in one of the arguments advanced by the superintendent.

4. Complaint because work would be scheduled, and then the foreman would be asked to get out other jobs not so far advanced, thereby causing confusion and delay (so he claimed). In this plant, most of the orders are special—in the manner of a custom shop—and the work usually is scheduled through the plant in the sequence in which the orders are received.

If an order is not to be delivered for some time, it is scheduled accordingly. Oftimes, however, a telegram is received, asking that a particular order be rushed on account of the opening of a store, or for a special sale or demonstration. In these instances, it is either "get the order out or cancel," and it would be business suicide to antagonize the customers and say that it couldn't be done.

Accounting for Time

5—The strict accounting for time on all jobs was a special sore spot to the foreman. He thought it proper to keep time on the regular jobs going through the plant, but insisted that keeping time on special jobs, which required matching and blending of colors, was unfair because sometimes it took an hour or two to get the proper match, and then the whole job could be sprayed in 15 or 20 minutes. By turning in the time it appeared as if much unnecessary time was wasted.

It is admitted that the matching of colors is a tedious job and one which costs considerably more than is received, but this is unavoidable. By keeping costs on such jobs, the dividing point between profitable and unprofitable jobs can be found, and the latter turned down, if possible. Sometimes it is not possible to refuse a customer because then he would go to a competitor.

Another thing to be considered is that before time on the individual jobs is turned in, the men often turn in much time for miscellaneous work, thereby covering up work poorly done, or they apply some time to finishing that has gone over on another job on which the time is being checked. They know that undue time on these jobs may be investigated, therefore they attempt to cover up such mistakes.

Such were the main objections of the foreman, and after complete explanation, he admitted the justice of the practices as carried out. The points objected to by the superintendent were as follows:

Superintendent's Objections

1—Lack of courtesy to visitors. Visitors were only brought into the plant for business purposes. If the expert from some paint firm stated that he saw some other plant doing a job in some other manner, the information given might be beneficial to the company, and should be received with much appreciation, rather than indifference or with the curt reply that "our way is as good as any". Executives from

"Abraham Lincoln once wrote to a young student, 'If you are resolutely determined to make a lawyer of yourself, the thing is half done already.' Resolutely determined! Doesn't that apply to making goods as well? I believe that half the success of the Murphy Varnish Company is due to its resolute determination to make good finishes."

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saves labor costs

We have developed Murphy Kauriol Flat Lacquer No. 1 to save sanding labor on furniture and cabinet work. You can now secure a beautiful mat finish with much greater ease and speed than has ever before been possible with a flat lacquer.

You do not even have to use sandpaper wet with water or oil—ordinary dry sandpaper knocks the nubs off into a powder. The resulting finish is desirable in every respect. Durability has not been sacrificed to obtain this unusual ease of sanding. Three coats give a perfectly satisfactory surface —four coats may be used for a superfine job.

This material goes particularly well over Murphy Kauriol Wood Preparation, our pyroxylin filler and stain, but may be used over other fillers with satisfactory results.

We should be pleased to have one of our representatives call and demonstrate this easy sanding flat lacquer to you.

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other organizations were only being given the same courtesy shown the superintendent and his associates when they visited these other plants.

Testing Materials

2—The question of experiments and tests. There were representatives from more than a dozen paint and varnish concerns calling upon this company. It was out of reason to expect the foreman to test every sample offered because it would take all of his time, and the time of several other men to do so. Often, however, statements were made by one of these representatives concerning the relative merits of his firm's products, either from the quality standpoint or the financial viewpoint.

It was necessary then to make the test and demonstration in the plant, under actual working conditions, in order to get the best results: the co-operation of the foreman in this was absolutely necessary. None of the samples were taken nor were any demonstrations allowed unless it was thought to have some potential value to the company, with the possibility of reducing costs or increasing the quality in the finishing room, both of which conditions should be of high value to a man who is loyal to his employer.

Elements of Cost

3—Carelessness in checking quantities and time spent on various jobs. It is not always possible to check all the time spent on various jobs, other than the information given the time keeper by the foreman, because of the work being spread out over several days and parts of jobs requiring matching or blending, while other parts go through regular. If too much time is spent on a job, some of the time and material may "accidently" be charged against some other job.

4—When new work comes into the plant the foreman is asked if he has done that kind of work before; his reply has been, invariably "certainly." Later the superintendent notices tests being made, which stop mysteriously when he approaches. It then turns out that some "trifling point" was being proved, when, in reality, it probably meant several days delay due to the stubbornness of the foreman. The company furnishing most of the material for the finishing room was always glad to send one of their experts down to help out, and this would save one or more days in getting the order to the customer.

It is suggested that the consuming industries conserve their stocks of China wood oil as much as possible, using bodied linseed oil and nitro-cellulose solutions where feasible, until such time as the present situation in China clears.

So long as industry can be substantially increased through an increase in industrial efficiency and the elimination of waste, by the same process the cost of manufactured articles to the public can be materially reduced.

Industrial factories, stores and equipment, and finishers' homes need "Save the Surface" protection just as other properties do, to look prosperous, bright and inviting.

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Know the Materials
You Use

Tung Oil and Other Oils

Brief and interesting notes relating to tung oil or China wood oil and a number of other drying oils used in paint and varnish industry

By Russell A. Brandt

NEXT to linseed oil, tung oil or China wood oil, is the most important oil used in the paint and varnish industry. During hundreds of years the Chinese knew and used this oil for many different purposes—for painting and calking wooden boats and for waterproofing; in some localities it was used for lighting purposes.

Tung oil is imported from the Orient where it is obtained from the nuts of certain trees, chiefly from the *aleurites fordii*. Some of these trees bear annually as much as 80-lbs. of nuts, which contain from about 20 to 40 percent of oil. The locality which produces the largest part of the oil is along the Yangtze River above Hankow, where there is abundant rainfall and a warm climate.

The fruits of these "tung trees" are about 2 or 3-in. in diameter and contain from two to eight large oily nuts. The fruits, or nuts, are gathered from the trees and then the husks are removed.

The Chinese have a very crude way of extracting the oil from these nuts. They first grind the nuts to a fine meal, after which they steam the meal in crude wooden tubs until it becomes soft. This soft meal is placed in presses and the oil is pressed out of it, leaving a press cake that is used for fertilizing.

Tung Oil Characteristics

China wood oil has a very peculiar and characteristic odor which some writers have compared to the odor of rancid grease. The oil will dry more rapidly than linseed oil, but the untreated oil dries to a film which is opaque and waxlike, and which has a tendency to wrinkle. It is also unlike linseed oil in its drying, as it tends to dry uniformly throughout the whole mass, rather than from the surface inwards—as does linseed oil.

The two most important brands of tung oil used in the United States are the Hankow and the Canton brands. The Hankow brand of oil is lighter in color than the Canton oil.

Tung oil does not "break" like linseed oil when it is heated, but it exhibits an entirely different property. If this oil is heated to 400-deg. F. the whole mass gelatinizes and forms a stiff jelly which is insoluble in the ordinary solvents.

All tung oil must be "treated" before it is used, as the oil in the natural state is of little value to the paint industry. In treating the oil, it is heated for several hours at a temperature just below that at which it coagulates or gelatinizes. Usually it is cooked or treated with the addition of resins or metallic driers, such as compounds of lead, manganese,

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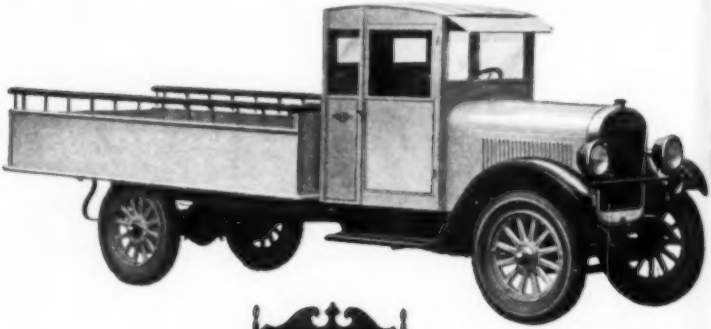
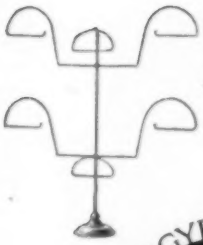


This group of illustrations shows a number of widely diversified products— furniture, stocking and display forms, motor trucks — manufactured by Hugh Lyons & Co., Lansing, Mich., and finished with Egyptian Lacquer.



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or even cobalt. This oil will now dry with a glossy and transparent film, rather than as a flat, waxy film, as it does before being treated.

During the past ten or fifteen years, tung oil has been the cause of much experimental work and today, even though it costs more than linseed oil, it is used in many paints, varnishes and driers, in order to impart to these some specific property.

A number of other oils have been, and are now being used in paints for certain purposes, but the total quantity of these oils consumed, in proportion to the amount of linseed oil consumed, is very small and their importance to the paint industry is not very great.

Soya Bean Oil

Soya-bean oil is extracted by pressing the soya bean, which is grown mostly in Korea and Manchuria. It is cheaper than linseed oil and is sometimes used as an adulterant in it. Some authorities state that the presence of small quantities of soya-bean oil may be used in linseed oil without producing any bad effects.

Soya-bean oil does not change color, or "yellow," on drying as much as linseed oil does, therefore it is used in certain types of paints where this change in color would be detrimental. It has also been found that certain pigments, when ground in soya-bean oil, are more satisfactory than the same pigments ground in linseed oil.

Menhaden Oil

Menhaden oil is a form of drying oil that is obtained from fish —principally menhaden. It is deleterious when used as an adulterant in linseed oil. However, it has its own particular place and has been recommended for use in smokestack paints and also in zinc paints which will be exposed to salt air along sea coasts.

Rosin Oil

Rosin oil has been used in cheap barn paints, etc., but now it is mostly used in cheap, black news ink and in the making of axle grease. It is prepared by the decomposition of rosin. When rosin is distilled, it first gives off a dilute acid, then a crude spirit and finally the oil known as rosin oil.

This is a very thick product and possesses a characteristic odor. It is not a drying oil in the true sense of the word, as it does not dry, and only upon prolonged standing does it tend to become resinous, but even then it will soften under heat.

Poppy Seed Oil

Poppy oil, or poppy seed oil, is a good drying oil, and it is obtained from the seeds of the poppy. It is a thin, yellow, odorless oil and is used mainly in the preparation of fine colors for artists' use.

A number of other oils that are classed as "semi-drying" oils include corn oil, cotton-seed oil, sesame, rape-seed, and castor oil, but they are relatively unimportant from a paint and varnish standpoint.

The class of non-drying oils, of which there are quite a number, have little or no value in paints and are very seldom used; peanut and olive oil belong to this class.

Cleaning up, like charity, should begin at home.

Industrial Finishing

PRACTICAL PUBLICATIONS, Inc.
Publishers
Room 603, 222 E. Ohio St.
Indianapolis, Ind.

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

EDITORIAL

More Mechanical Equipment Used in Modern Finishing Rooms

From brushes and cans and drying racks, finishing - room equipment has rapidly developed to the point where mechanical apparatus is now available and in service, in many establishments, for every operation and movement of material. For applying materials there are spraying, flowing, tumbling and mechanical dipping appliances.

For forced drying of certain finishes we have several force-drying systems whereby air is drawn into a clean dust-proof room, cleaned, warmed, circulated around the finished surfaces and expelled, or reheated and recirculated. Other more rapid-drying finishes—lacquers—dry quickly and effectively in ordinary factory atmosphere.

For metal cleaning preparatory to priming, there are chemical cleaners, steam cleaning, drying ovens, rotary wire brushes and sandblast equipment.

For wood surfaces there is a great variety of machine sanders for use on individual parts and units in the white, but we still have light sanding of surfaces between finish coats, by hand. Here, indeed, is room for improvement—an opportunity for someone to develop a light portable device that will do what hand sanding is doing today in finishing rooms.

Mechanical rubbing devices have been available and in successful use for some time, but only in a limited variety of styles and makes. Something new in this line is about ready to be released, and we will learn more of it in the very near future.

Other equipment which is coming into more extensive use in industrial finishing and paint departments, and which offers attractive possibilities in the way of saving labor and time, includes conveyors of many varieties in size, kind and make. Surface and overhead conveyors, which carry the material in process from one operation to another and through drying compartments when necessary, or desirable, help wonderfully in placing the finishing department on a modern production basis wherein definite time schedules can be maintained.

Equally as important as equipment for performing productive operations, moving material and drying finishes, is apparatus for making finishing rooms healthful and safe for workmen, without whom nothing would be or could be accomplished in any finishing department. Adequate ventilation and the rapid removal of all fumes is important, not only for health, light and cleanliness, but to reduce to a minimum the fire and explosive hazards.

IS the appearance of the finish lending distinct character and individuality to your products? Does it stand out with permanent and attractive appeal? It should—for a fine finish on beautiful furniture is as important as a well chosen design.

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So that you can try out VITRALOID WOOD LACQUER No. 2546, let us send you a generous testing quantity. Drop us a note today, and a no charge sample will go forward at once.

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Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Lacquered Decalcomania

We are manufacturing a line of novelty furniture, and using decalcomania transfers in our decorating. We wish to spray a coat of clear lacquer over these transfers, but find it raises them to use the cement or varnish recommended by the transfer people. If you can give us any information on this, it will be greatly appreciated.—S. K. M. Co.

Decalcomania transfers have been used for a number of years for decorating furniture and other articles finished with varnish and enamel. With the advent of clear and colored lacquers, these decalcomania transfers are still being used, but many finishers have experienced considerable trouble in applying them in a satisfactory manner.

Some have made the mistake of trying to use library paste, glue, white shellac, and similar mediums for sticking the transfer to the surface, with the result that when a coat of clear lacquer was applied over the transfer it was softened and blistered by the lacquer solvents.

The proper method of applying a decalcomania transfer on lacquered work is to first bring up the finish in the colored lacquer enamel, or in the clear lacquer, to all but the last coat. This is then sanded or rubbed smooth, where extra-smooth work is wanted. The back of the transfer is coated either with the cement which is furnished by the manufacturer of decalcomania transfer, or with a good grade of rubbing and polishing varnish which has been thinned down considerably with turpentine.

The transfer is allowed to stand for a few moments after the varnish or cement has been applied, so that it begins to take on a slight tack. Then it is placed in the proper position on the surface, and smoothed out carefully, preferably by passing a soft rubber roll or a similar instrument over it so as to remove all air bubbles and wrinkles.

Following this, the back of the transfer is soaked thoroughly with water to soften the paper. This paper is then carefully pulled away from the transfer. The excess moisture is wiped off and the design is pressed into closer contact with the surface by patting the transfer lightly with a soft crumpled cloth, after the paper has been removed.

Then take another soft piece of cloth, dipped in turpentine or kerosene, and lightly go over the transfer around the edges to remove the excess varnish or cement. This should be done before the varnish or cement has time to thoroughly harden and dry. After the design or the transfer itself has been cleaned, the work should be allowed to

Lacquer has its place
Varnish has its place

This is admittedly a "lacquer age" but lacquer, like everything else, has its place. To use it out of its place means false economy and lower profits.

There is still a place for *Varnish* and we have the *Varnish* for the place.

Hundreds of furniture manufacturers are using our varnishes on products embracing all the various pieces and suites necessary to furnish the home.

The fact that we are continually adding new customers to our list bears out our statement that there is still a place for varnish.

At this time we are concentrating our efforts on two particular varnishes which we heartily recommend for all kinds of furniture—

Our CRYSTAL RUBBING produces either an excellent dull rubbed or polished finish at a low cost.

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Indianapolis Varnish Co.

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Indianapolis, Indiana.

stand overnight, so that the cement or varnish can harden thoroughly. Next morning a coat of clear lacquer can be applied over the surface to protect the transfer and to give a finished appearance to the job.

It is very necessary to make sure that the transfer is rolled down tightly against the surface, so the cemented area is free from all air bubbles at the time of application. Otherwise the lacquer will soften the transfer in these spots and cause it to raise up in small blisters, which will entirely spoil the effect. Likewise, if the size is applied too thickly under the transfer, or is not allowed to dry sufficiently, there is danger of the lacquer causing blisters to form.—I. F.

Light Walnut Fixtures

I am particularly interested in articles on finishing wood fixtures, especially in light finishes on walnut, where there are a number of different shades, light and dark. Is it best to wash coat the work first before wood filling?—C. H. P.

In making light finishes on walnut, where there are a number of different shades of wood, it is very difficult to get an absolutely uniform final shade. Various methods are used in an effort to get a uniform color, which consists of preparing the darker portions of the wood only, with various chemical solutions, such as sodium bisulphate, sodium hyposulphide, hydrogen peroxide, oxalic acid, and similar oxidizing agents. Of course, any of these chemical solutions should be thoroughly removed from the wood before continuing to finish.

Sometimes it is also advisable to slightly darken the extra light portions of the surface by means of spirit-soluble stains, and where the lightest type of finish is wanted on walnut, it is customary to apply a wash coat of shellac, or a thin coat of clear lacquer before filling. This seals the wood against the absorption of oil from the filler and consequently prevents it from being darkened.

Ordinarily, it is not a good policy to wash coat the wood before filling it, as it prevents the filler from adhering in the pores as satisfactorily as when the wash coat is not used, but where a very light color is wanted, it is necessary to wash coat to prevent the oil from darkening the wood. —I. F.

Silver Gray Oak

We would like some information regarding finishing silver gray and Oriental brown on oak. —C. C. Co.

The exact shade of Oriental brown on the oak to which you refer is not familiar to us, consequently we can not give you definite instructions for producing this finish.

The customary method of producing a silver gray finish on

LACQUERS for Wood

Pioneers in wood lacquers that give a finish that lasts. Made to satisfy users for sixty-nine years. Write us your requirements.

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90 Worth St., New York
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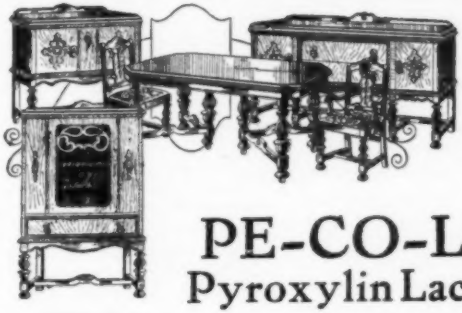

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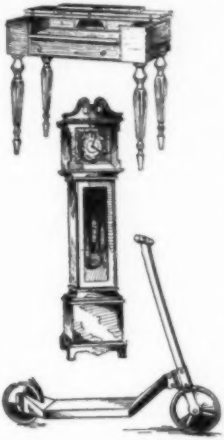
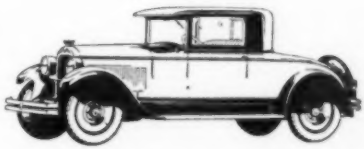


Used extensively by manufacturers of automobiles, velocipedes, clocks, desks and furniture of all kinds.

Pe-Co-Lac is a tough finish that stands use and abuse. It saves time and eliminates cold cracks and checks.



It can be supplied for spray or brush work, either in the clear or a wide variety of color combinations. Liberal sample on request.

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oak is to, first: stain the oak with a very weak solution of black water soluble nigrosene or stain powder. Let this dry thoroughly, then wash coat the oak with a thin solution of white shellac made by mixing one part of 4-lb. cut white shellac with seven or eight parts of denatured alcohol.

It is necessary to use this wash coat of shellac for two reasons: In the first place, the water stain has a tendency to raise the fiber of oak, and the shellac coat stiffens these fibers so as to make it easy to cut them off with sandpaper.

The second reason for using the wash coat of shellac is that when the pores are filled with a white or gray paste wood filler, if the shellac coat is not on the wood, there will be a tendency for the filler to smear while being wiped off. It will not give a clean-cut appearance. The white or gray paste wood filler, which is used for filling the pores of the wood after the staining operation, can be obtained from any manufacturer of finishing materials who advertises in this magazine.—I. F.

Antique Walnut Finish

I am making a set (dining room) of American black walnut, copies of old Spanish pieces, for a customer's home in Florida, and a simulation of the old in finish is wanted. I would like to finish these pieces as nearly as possible in the old golden-brown walnut shade, and would prefer not to use a varnish or shellac. Can you advise me as to the best way to accomplish this from beginning to end?—H. E. C.

A good imitation of a genuine antique finish may be obtained with water stain, sanded down smooth when dry and, if desired, high-lighted on the raised parts and turnings with fine steel wool. The stain should be followed with a fairly thin spray coat of clear wood lacquer, and finished by rubbing with paste wax.

A good stain color would be obtainable by mixing equal parts of walnut crystals and jet nigrosene powder in a total volume of 2 to 3-oz. to the gallon of hot water, according to the depth of shade desired. A browner tone will be imparted by increasing the portion of walnut crystals; a blacker tone by increasing the nigrosene. For a golden tone, add a pinch of lemon yellow aniline powder.

If no spray is available, a fairly good job can be done by reducing brushing lacquer very thin, but a spray job would be preferable.

For the oil finish, it is probable that you desire a cleaner and "reviver," rather than an actual polish. This may be made from one part paraffin oil mixed with two parts petroleum naphtha. This will not raise the luster but will give the surface a cleaner, clearer tone.—R. L. Masterson.

When in doubt, consult your industrial finishing salesmen.

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Comments on March Articles

Recently the March edition of INDUSTRIAL FINISHING was handed to me and I was very much impressed with it—so much so that I am asking a few questions regarding some of the articles printed.

All who are interested in the paint and varnish industry have a few pet hobbies which we do not readily discard, so any criticism I may make is solely for the purpose of having these questions cleared up in my own mind.

The article, "Why Paint Peels," page 10, is very good, but there is one point that is not entirely clear to me. I have always been of the impression that a paint that would peel was one that had a high content of oil, and when dry produced an extremely hard film. A paint as described in the sixth paragraph of this article, page 11, would be a short-oil paint and should have a tendency to chalk.

In the article by J. K. Cooper, page 14, I felt that as everything new in lacquers should be of much interest, that lacquer spot putty should have been mentioned here.

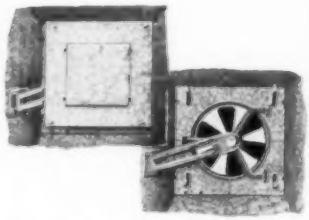
In the "Question and Answers," the article "For Luster on a Polished Lacquer Surface," the scum on this surface I believe is caused by an excess of plasticizer or soft gum in the lacquer, either of which would cause the effect described. In other words, the lacquer is not drying hard enough.

Regarding "Finishing Fiber Furniture," page 60, I have no knowledge of glue, but they specify that the enamel film dries soft and is chalky. This condition is caused by an excess of resin in an oil varnish. This furniture company should be advised to subject this finish to an exposure test to find out how long it will be before checking commences.

I would appreciate replies or comments on the above points.—O. T. Norot.

Portable Baffle News

The accompanying cut shows one spray booth fan with and one without the protection of a portable baffle, such as is supplied by the Eureka Pneumatic Spray Company of Richmond Hill, Long Island. The purpose of this baffle is to guard the fan from



Views showing baffle in place and removed.

spray materials, which are drawn toward it by the suction of the exhaust. Fumes find easy passage through and around the baffles. This baffle is light in weight and can be easily removed for cleaning.

The mounting of the fan shown in this picture is such that it swings in for cleaning. The arm extending to the center of the fan is a guard for the drive belt.

Labor's interest in the problem of waste elimination should be based upon its wish to secure higher wages and to enjoy improved conditions of employment.

This Section is devoted to the application, baking and polishing of finishes to be dried in ovens.

Baked Finishing

Showing part of MAEHLER Oven equipment in the Yawman & Erbe Mfg. Co. plant, where two electric and two Non-explosive gas ovens are giving unusually satisfactory service.

Doing it Right!

TO GET a first-class baked job, it is essential—and this is proven by facts—that you have the proper equipment. Not just any old equipment that would seem to serve the purpose, but properly designed and durable equipment for doing the work RIGHT, made by specialists in their line.

MAEHLER Ovens employed in enameling, japanning and lacquering can be safely depended upon. To the skeptical, we are in position to point to several satisfactory installations in plants of well-known concerns. Gas, electric or oil heated—there is a type of MAEHLER oven to fit your particular requirements. Very interesting and helpful literature gives full details—yours for the asking.

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DRY-SYS
Standardized Equipment for Low Temperature Drying of Paint, Varnish and Lacquer and for High Temperature Baking of Enamel and Japan.
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Some Practical Experience From England

Tests of Finish Drying Ovens

An account of the tests conducted and results obtained with different finish drying ovens, by a manufacturing concern in London, England

By Londoner

AT the Malta Works of R. Fox & Sons, in Clerkenwell, London, England, extensive operations are carried on in the lacquering, bronzing and electroplating of metals; also the bronzing of plaster, wood and other materials. Some of the articles thus treated are decorative art metal ware, illuminated advertising signs, plaster figures, gas and electrical fittings, motor car fittings, phonograph parts, various household fittings, and other goods too numerous to mention.

This work involves painting and spraying with materials containing volatile spirits which are highly inflammable. The spraying operations in particular so saturate the air of the spraying rooms with inflammable vapors that extreme care has to be taken to insure that no "naked" flames are brought into the rooms. Work of this nature is kept under con-

Finishing procedure in the art department of an English factory.

stant and strict observation by the London County Council.

The sprayed goods have to be dried by artificial means, and for this purpose fairly large drying ovens are used.

An Electric Oven

The first drying oven installed was 6-ft. high by 4-ft. wide by 4-ft. back to front. An electric element heater was fixed in it, the users being under the impression that this was the only safe method, as the heating elements were completely inclosed and could not therefore come into contact with the air in the oven. The oven so equipped was kept in use for six months, but was found to be unsatisfactory for two main reasons:

1. It was not possible to obtain sufficiently high temperatures to cope with the amount of material which had to be dried.

2. The cost of the current used was too high.

This heater consumed 1½ units per hour, costing (with electricity at 3 cents per unit, plus 40 percent) 6.3 cents per hour. At this rate of consumption it was seldom possible to raise the temperature in the oven above 75-deg. F. The oven could not be hermetically sealed, as the vapors given off by the drying articles had to be allowed to pass from it.

On April 23, 1925, the company made a test. Three trays of small aluminum-sprayed articles were placed in the oven at 12:09 p. m. At 12:38 p. m. the articles were fully dried, the drying operation therefore taking 29 minutes. The temperatures attained in the oven during the test varied from 68 to 74-deg. F.

Some time prior to the making of this test, the management had been in touch with the industrial heating expert of the local gas company, with a view to the latter submitting suggestions for heating the oven by gas, on the understanding of course that the system would comply with the requirements of the London County Council as regards safety from fire.

Regulations and Requirements

The expert declared there were no insuperable difficulties in complying with the regulations of the London County Council, and that he could make a definite promise of higher temperatures in the oven at a reasonable cost for gas. At a later date he submitted plans for the conversion of the oven to gaseous heating. The results obtained from it, as regards gas consumption, temperatures obtainable, and speed of drying were satisfactory.

The requirements of the London County Council that no flames should come into contact with the spirit-laden air of the spraying room and the interior of the oven made it essential that:

1. The gas burners should be inclosed in a casing which would prevent air from the drying room entering it.

2. The burner should be lighted at a point outside the drying room.

3. Air to support combustion should be taken to the burners from outside the room.

4. The products of combustion should be discharged outside the room.

Gas Heating Installation

The heater consists of:

1. A combustion chamber, which is a welded wrought iron box approximately 4-ft. long by about 9-in. wide by one foot high.

2. A long bar saw-cut gas burner, fixed inside the combustion chamber.

3. A pilot light by means of which the burner is lighted.

4. A flue pipe, with welded joints, to carry the products of combustion into the outer air.

5. A shield consisting of a piece of sheet iron bent into the shape of an inverted U and placed along and over the combustion chamber. This serves a double purpose. It prevents sprayed articles in the oven from coming into contact with the heated surface of the combustion chamber; it also acts as a heat diffuser, thus insuring an even temperature throughout the drying oven.

On May 14, 1926, a test was conducted with this oven. At 3 p. m. the temperature in the oven was 110-deg. F. and the gas burner was lighted up. At 3:20 p. m. a temperature of 154-deg. F. was registered, and the oven was then loaded with a charge of aluminum-sprayed goods almost identical with those used in the oven when the previous test was made. These goods were taken out of the oven at 3:27 p. m., fully dried.

When this test was made the gas consumption was at the rate of 50-cu. ft. per hour. The gas used during the seven minutes drying operation was therefore slightly under 6-cu.ft., or six cents for a 500 B. t. u. gas at $1.00 per 1,000-cu.ft.

By substituting gaseous fuel for heating the oven, five batches of sprayed goods can now be dried at the cost originally expended on fuel for drying only one batch, and in one hour eight batches of goods can now be dried in the oven, whereas previously only two batches could be dried in that time.

Space and Speed

It must be remembered that the saving effected by the gas heater is not limited solely to the reduction in the fuel bill. Under the original slow-drying system, racks had to be provided for storing trays of sprayed goods until such time as they could be loaded into the oven, incidentally involving a double handling of the goods. These trays and racks occupied valuable space.

The oven, as now heated, is so rapid in its drying operation that the trays of sprayed goods are loaded into the oven as soon as the spraying operation is completed, and the goods are fully dried by the time the next batch is ready; and so on throughout the day. The release of the space previously occupied by the racks is an important gain in view of the remarkable growth in the amount of work done in the factory, and the consequent need for all available space. Floor space in the City of London commands, of course, an extremely high rent.

SUPERIOR WOOD STAIN POWDERS

For Lacquer and all finishes.

Complete variety of shades. Samples and information on request.

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314 W. 14th St., New York

Japanning Methods—and Ovens

Revealing modern production methods of applying and baking the japan finish, and explaining characteristic features of baking ovens heated by electricity, steam and gas

By Earl Thornton

THE MAJORITY of troubles encountered in the use of finishing materials is generally traceable to local conditions, such as faulty application or methods of handling the articles before or after coating.

No manufacturer of baking blacks is infallible, nor claims to be, but more often than otherwise the product has been condemned when it was known to be all right. For instance, if part of the work comes out all right and part wrong, then the metal has not been properly cleaned, or there is something wrong with the oven — poor ventilation or variable heat—because when the japan or enamel itself is bad, the whole ovenful of work will come out bad.

Therefore, once the cause is located, usually it can be removed and the fault remedied. It is for the purpose in helping to analyze conditions in the finishing department that the following information is given.

It shall be understood in this article that the terms "enameling" and "japanning" are used interchangeably, and refer to those black varnish-like materials of asphaltic composition that are hardened by baking in suitable ovens, whether heated by steam coils, gas fire, electricity, or other means.

Tumbling—Dipping—Spraying

Application is by a number of methods, depending upon the nature of the article to be coated, the type of finish desired, the quantity of work to be done, and other conditions. The usual methods are:

Dipping or immersing the article in a tank of enamel or japan previously reduced to proper consistency.

Tumbling, whereby the articles are put into a barrel or similar container which is revolved and rolls the articles around in the material. Usually the material is reduced about equal parts with benzine and just a sufficient amount is put into the tumbling barrel to coat the articles without any surplus remaining, because the secret of successful tumbling is in applying thin coats.

The tumbling process is applicable only with baking goods—air-drying enamels cannot be successfully tumbled—and is suitable only for small articles which do not nest, nor have flat surfaces which would stick together.

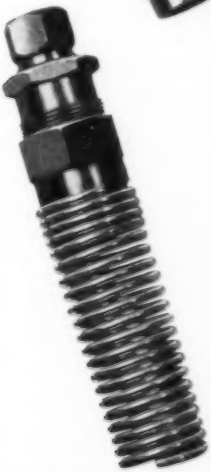
A great variety of automobile accessories such as lamps, horns, speedometers, instrument boards, etc., are sprayed.

Baking Ovens

Ovens vary in size, design, and construction, but are most commonly made of sheet or galvanized iron and insulated to avoid undue radiation of the heat outside, and also to maintain the temperature constant within by preventing outward influences.

Electrically heated ovens are excellent in every respect, but are considered by many manufactur-

Spray Hose Couplings



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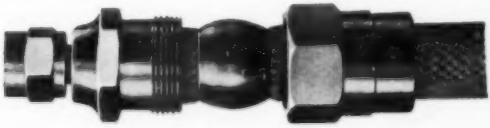


The EASTMAN Way

ers to be too expensive. Their great advantages, however, somewhat compensate for the difference in cost of operation, because they can be equipped with thermostatic control. This relieves the foreman or workmen from watching the heat and permits them to attend to other duties in the interim. Through securing uniformly-baked finish the loss from defective work is reduced to a minimum.

The automatic control feature throws on the current when the oven doors are closed, regulates the temperature as it increases or diminishes from the heat for which the thermostat was set, and at the expiration of the baking period the current is also automatically cut out.

A further advantage in large plants, where numbers of ovens are in use, is that the superintendent or department foreman can check up on the baking at any time without leaving his office. By installing in his office or in some convenient location, an indicator directly connected with each oven, he can turn the pointer to any oven and the pendulum swings over to the charted temperature on the dial, indicating instantly the actual heat of that particular oven.

Steam heated ovens are ideal for baking on wood or soldered metal, because they are gradual in heating and it is difficult to heat beyond 250 degrees F., unless by the use of superheated steam or some other device. Starting with a minimum or low heat and gradually raising the temperature until the desired point is reached, and then holding it there for the prescribed length of time, is the ideal procedure, except for specific results to be otherwise obtained.

As a rule, wooden articles or parts cannot be baked at a higher temperature than that required to drive off the moisture or water in the wood. Ordinarily the baking heat should not exceed 200 degrees F., and even this will be too high if the baking is prolonged. More on this topic will be included in another section of this article.

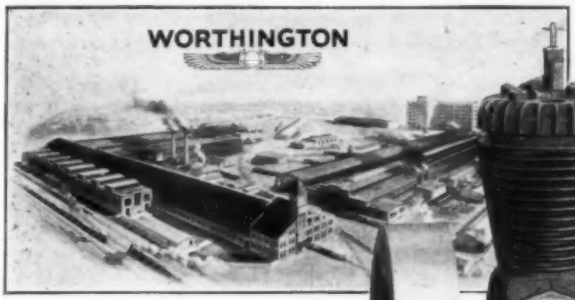
Gas heated ovens are most commonly used, and of these there are two kinds—the open-burner type, and the indirect-heated oven in which the burners are inclosed in a separate heating chamber, eliminating all danger of fire or explosions.

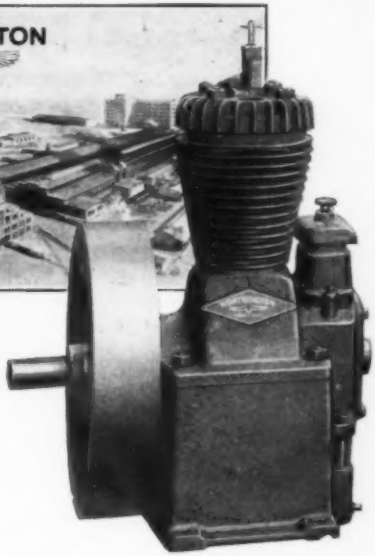
The main points in building a successful oven are to provide adequate ventilation to carry away all vapors given off during the baking process, and to have the heat evenly distributed throughout the oven. Unless japanning ovens are amply provided with dampers and escape flues for getting rid of the fumes and smoke, the drying will be greatly retarded.

Cleanliness is Imperative

Cleanliness is the first requisite in doing high class work. The department, the ovens, and all apparatus and fixtures must be absolutely clean and dust-free, because no other finish than a bright black gloss will show specks of dirt as plainly, particularly on a smooth flat surface. There is no use in having the enamel mechanically clarified by the maker, if, in usage, the goods will be subjected to dirty shop conditions.

Clean the sides and ceiling of the oven by removing all loose particles with a scraper, washing with a rag or sponge wet with reducer; then turn on the heat for 30 minutes to dry it off.





What's wrong with this picture?

IT shows the Worthington FEATHER (Reg. U. S. Pat. Off.) Compressor and the works in which it is made. But it doesn't tell the whole story. It cannot convey to you any conception of the high manufacturing ideals and refinements of design and construction embodied in Worthington Compressors. Similarly in this advertisement we cannot enumerate all the factors that contribute to the unexcelled operating results obtained where air for painting is supplied by a Worthington Compressor. The following are but a few of these factors:

Feather Valves—The lightest, most responsive and longest-lived valve ever devised for compressor use. Gives perfect contact, insuring high volumetric efficiency. No taps. No adjustments.

Special Piston Construction insures pure air free from oil.

Balanced Flywheel.
Counter-balanced Crankshaft (solid forging)
Forced-feed Lubrication.
} Mean high mechanical efficiency, smooth operation, no noise.

Cylinder and head thoroughly cooled—submerged in water-cooled type; effectively finned in cooled type to give large radiating surface.

WORTHINGTON PUMP & MACHINERY CORPORATION
115 BROADWAY, NEW YORK CITY
6732-2 Branch Offices in 24 cities

Never paint or oil the inside of the oven, because such coatings eventually flake off and fall down onto the work.

To keep down the dust in the oven, it should be cleaned thoroughly at least once a week. Wipe over the entire inside—not omitting the corners, the rods, and all edges,—with a "tack rag" made by saturating cheese-cloth with an elastic varnish and wringing out the excess, then allowing the varnish to dry until it becomes tacky or sticky. The tack rag will readily pick up all dust and lint.

A tack rag is further useful in wiping off the articles to be finished immediately before coating, in order to insure all lint and dust being removed. If the tack rag cannot be used to clean behind the heating units, or between the false and true ceilings of the oven, or any other part not easily accessible, then a vacuum cleaner should be used to suck out the dust and dirt.

The floor should be cleaned daily in such a manner as does not circulate the dust elsewhere. When hanging work on the rods in an oven, let the weight of the article gradually come to easy rest on the rod to prevent vibration which would disturb any dust and cause it to settle down onto the work. Do not swing the oven door rapidly, as the draft created draws dirt into the oven and onto the work. Should the door drag on the floor or stick from other cause requiring vigorous closing, have it fixed at once so it can be closed slowly and gently.

When through baking an ovenful of work, let the temperature fall somewhat before opening the door, this for the reason that if opened immediately the inner heat is likely to suck in dirt that would adhere to the sticky surfaces, whereas slight cooling down enables the surface of the japan to become hard so dust will not stick to it.

The final finishing work must be isolated from the room where first-coating is done and more or less sanding and cleaning preparatory to the finishing; by this arrangement much better results are assured.

In the countries of the Far East lacquer was used centuries ago.

Many brushing lacquers contain a considerable proportion of varnish gums and are more nearly akin to varnishes than are the spraying lacquers.

The furniture industry was the first one of the large users of materials employed in producing finishes for wood that took up lacquer and in a few short years used it to considerable extent.

The process of lacquer application is everything. One of the great difficulties the manufacturers of lacquer had in getting concerns in the furniture and piano industry to use lacquer, was to impress upon them that the result desired and obtained depends altogether upon the process of application. Most certainly the quality of the lacquer is a most important element, but the best lacquer will prove unsatisfactory if not properly applied.

"Save the Surface" products are the life blood of the industry, just as they are the life savers of the property to which they are applied.

Quincy Model H

A popular spray painting unit. Either 3x3½ in. or 4½x3½ in. compressor for 1, 2 or 3 gun operation.

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for complete units

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Your customers depend upon you for a quality paint job. Give them that, with good service, and you'll not need to worry about present profits or future business.

To turn out a smooth, perfect finish, your spray gun needs a steady, unfailing, dry air supply. And for that, *you* can depend upon a Quincy Compressor. Quincys are engineer-designed and built by us, not assembled. Their silent, trouble-free service and long life complete the efficiency of all standard paint spray outfits. Be sure to specify "Quincy" when you order new equipment or replace your present compressor unit.

Write today for complete, free information

QUINCY COMPRESSOR CO.

305 Maine St. QUINCY COMPRESSOR **Quincy, Ill.**

K750

Refinishing Motor Cars in Small Shop

Consultant on finishing problems gives specific and detailed instructions for refinishing automobiles in the smallest type of shop—according to the latest approved methods

By K. N. Kathju, M. S.

BEFORE proceeding to handle a car in the "modest repaint shop," as described in last month's issue, the operator should have it thoroughly steam cleaned at a regular "Auto Laundry," thereby saving himself much valuable time. Special attention should be paid to the cleaning of chassis, for unless same is free of all grease and oil, pyroxylin will not adhere to its surface.

In small towns where the facilities of "Steam Auto Laundries" do not exist, the operator may have the chassis cleaned with strong alkaline solution, or even soap solution in warm water. Operators should not resort to such washing and cleaning themselves, unless they have the floor space and time to do it.

Operation No. 2

Dismantling Fenders, Dust-shields, etc.

If the car owner desires to have the fenders, dust-shields and other enameled surfaces re-enameled, these parts should be removed and sent to a paint shop that specializes in enameling. For all general purposes, unless otherwise specified by the owner, enameled surfaces may be beautifully finished in pyroxylin. In this latter case, operation No. 2 may be disregarded.

Operation No. 3

Bumping Out, and Removing Hardware

Bumping out dings, etc., should be done only if the owner is willing to pay for such service. The body should be thoroughly inspected and all dings, etc., chalked out. If necessary, have an expert do the work, although the work may be safely done by operator using standard bump-out tools. Door handles and other hardware should be removed at this stage.

Operation No. 4

Removing Old Paint

If the car body is finished in oil-base paints or varnishes, which are badly checked, it will be necessary to remove the old paint and varnish. If the checks are extremely fine, they can be filled with one or more coats of surfacer.* If the old surface has been finished in pyroxylin lacquer (or Duco), removal of the old material is not only unnecessary but inadvisable. When old paint has to be removed, due to bad checks, proceed as follows: Spread newspapers on the floor and push the car about to the middle of it.

Caution: Do not run car under its own power in shop. An en-

*To be discussed later.

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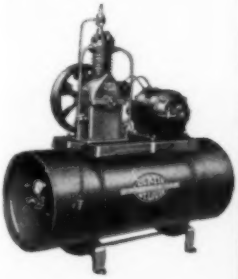

Controlled Splash Lubrication Only in the Curtis

If you will examine the compressor as carefully as you do the spraying outfit before you buy, you will become thoroughly sold on the Curtis system of lubrication as the most effective way to minimize clogging the filters with oil.

Overloaded filters permit oil to mix with the paint and spoil the job. A good filter is not sufficient protection against an oil pumping compressor. *Trouble-proof lubrication of the compressor* is the only sure way.

Other lubrication systems, even when claimed "similar" to the Curtis, do not and can not prevent excess oil as reliably as it is effected by the patented Curtis Controlled Splash System, tested by 30 years compressor experience.

Curtis Compressors are so designed, and are built to such exacting standards of accuracy that they are ideal for spray painting work. This explains their practically universal adoption or approval by spray gun manufacturers.

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CURTIS COMPRESSORS

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SOME lacquers have a tendency towards pebbling. By properly adjusting the spray gun, air-pressure, distance from the surface, etc., it is possible to get remarkably smooth work with properly balanced lacquers.

ALAKA is a properly balanced lacquer and on request we will send samples so that you may learn how smoothly and perfectly it sprays, how lasting and lustrous are its finishes and how economical it is to use.

By the way, have you your copy of our booklet, "Finishing Facts?" If not, write

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gine back-fire may cause a serious fire.

Fill a cup with some paint-and-varnish remover, and, using either a cheap 2½-in. flat brush or a sash tool oval brush, begin

Fig. 1—Using steel wool for obstinate spots. Notice rubber gloves of operator—a necessity when using paint-and-varnish remover.

with the upper back and proceed to apply same on the old paint. It is advisable to work from the top down.

As the paint-and-varnish remover is applied it seems to blister the surface, as shown in Fig. 1. The blistered surface may be easily cleaned with a 4-in. glazing knife. Spots where the old paint has stuck to the metal "closer than a friend," may be slopped over again with some more remover, or better still, it may be cleaned with steel-wool, as shown in Fig. 2.

If a lower cost lacquer job is desired, in spite of the checks, this operation may be omitted. Instead, the checks can be filled with surfacer after pyroxylin priming.

Operation No. 5

Sanding Bare Metal or Old Paint Surface

Whether or not the old paint has been removed, dry-sand the surface, using No. 2/0 light

weight aluminum oxide sandpaper. In case of an old pyroxylined surface, however, No. 240 aluminum oxide paper may be used for sanding. Fenders, dust-shields, etc., if not removed for enameling, should also be similarly sanded. It is absolutely necessary that all rust be removed. In obstinate cases, use sandpaper dipped in kerosene or naphtha. Use compressed air to blow out all foreign matter dislodged by the sandpaper.

Operation No. 6*

Preliminary Washing With Naphtha

Immerse a sponge or cloth in a cup containing naphtha or mineral spirits, and wash the entire upper part of car body, a small area at a time. Wipe dry with clean rags.

Next, wash the entire lower surface similarly. Special attention should be directed to door hinges,

Fig. 2—Showing effect of paint-and-varnish remover on old checked surface.

under the belt moulding, T-mouldings, side sills, door jambs and other inaccessible parts,

*Operations Nos. 6 and 7 should be performed only in cases where paint-and-varnish remover has been used. In all other cases use 50 per cent water and 50 per cent high-test gasoline for washing.

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Gibraltar Lacquer — the new and superlative finish is—"IT".

Why? Because Gibraltar Lacquer possesses the combination of qualities that gives attractiveness—and salability.

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"IT" *has Covering Power*—one or two coats of Gibraltar Lacquer give better results than many coats of ordinary material.

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where a 3-in. sash tool oval brush may be used. The utmost care must be exercised in removing the last vestiges of grease, oil, etc.

Note: These operations are for closed cars. The open cars may be treated same as the lower part of closed cars.

Wear rubber gloves for operations 4 and 6.

Operation No. 7*

Final Wash With Alcoholic Solution or High-Test Gas

Repeat operation No. 6, using a denatured alcohol, water and ammonia solution, a formula for which has been given before in this journal. Wipe dry entire surface. This will counteract the acidity of soldering compounds and paint-and-varnish remover, if any. Where caustic solutions are used for paint removing, wash with high-test gas in addition to preliminary washing with naphtha.

Operation No. 8

Covering Windows, Windshield, etc.

Cover all windows and nickel-plated surfaces with paper held close to the edge with special lacquer grade tape. Hub caps, plated headlights, plated bumpers, etc., may be either similarly masked or given a coat of grease, which can be easily removed after refinishing.

Operation No. 9

Pyroxylin Priming

Unless otherwise specified by the manufacturer, all pyroxylin products, such as primers, surfacers and finish coats, should be reduced with their own volume of pyroxylin thinner. This is

generally referred to as reducing 100 per cent or cutting fifty-fifty (50-50).

Where old paint has been removed, it is necessary to prime bare metal, since most of the pyroxylins on the market today will not stick to the bare metal. Consequently the entire surface to be refinished is sprayed with a thin coat of primer.

Such pyroxylin primers are tinted with a brick red or gray pigment. The pigment has been added to pyroxylin primers for operators to see that the surface has been covered "solid" and that there are no skips. Thus the color of primer has nothing to do with working qualities.

Where old paint has not been removed, it is necessary to seal the old paint underneath, because some pyroxylin lacquers have the tendency to lift or blister the old paint—very much like paint remover. A coat of pyroxylin primer will offset the effects of pyroxylin lacquers and their thinners. If the surface to be refinished was originally finished in pyroxylin, it is not necessary to prime it. Only the bare metal spots need be spot-primed.

Note: There are pyroxylin finishes on the market which are what you might call "a combination piece of goods," and they can be applied directly to bare metal, without the necessity of priming. Ask your dealers or INDUSTRIAL FINISHING about it.

Before proceeding to spray wear a respirator.

Fill the cup attached to air brush with primer, reduced as per manufacturer's instructions. If you are using a gravity-feed bucket, as suggested in the last

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You may be able to go out and buy cheaply-made lacquers and lacquer-enamels at a lower price than Zellac—but none more economical.

Economy goes back further than purchase price. Service, quality, applicability and covering qualities must be considered. All of these reach back to lacquer-manufacturing methods.

Zellac is the product of *controlled* raw materials used under *controlled* process of manufacture. Uniformity *must* result.

We avoid the failures which come from over-standardization in the large volume production of ordinary finishing materials—we *protect* you against all that, by serving you with the one best grade of Zellac, compounded precisely to a formula or prescription that is first worked out by Zeller chemists *especially for your finishing requirements.*

We know how to do this because we have two generations of exclusive lacquer-making behind us. Let us determine the prescription which will provide you with correctly compounded Zellac grades for your products.

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ZELLAC

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issue of INDUSTRIAL FINISHING, connect air brush to the material hose. Likewise, attach the air hose from oil-and-water separator to the air end of the air brush, and turn on air.

Use Adequate Air Pressure

It is extremely important that spraying be done at air pressures of 70 to 100-lbs. At lower air pressures, the atomization of lacquer is usually so incomplete that it results in an "orange peel" effect, which prolongs the agony of polishing.

There is no such thing as a "low pressure" air brush. There are air brushes that use as little as 4-cu.ft. of air as against 7 or 8-cu.ft. used in others, but it does not mean that they can operate just as efficiently at 35-lbs. air pressure as the other one at 70-lbs. The subject of air brushes will be discussed in detail in a subsequent issue of INDUSTRIAL FINISHING.

Switch on the suction fan and, holding the air brush in right hand, about 7 to 10-in. from the surface to be sprayed, proceed to spray a panel at a time with a solid coat of primer. The spray nozzle should be so adjusted as to have air holes at right angles to the plane at which the air brush is being used. This necessarily implies that the fan-spray emitting from the air brush must be at right angles to the plane at which the material is being sprayed.

However, the spraying of the body proper may be proceeded with the priming of chassis, fenders, dust-shields, hood, etc.

Immediately following priming operation, clean the air brush by

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"Nitrators since 1898"

When writing for samples please state quantities, grades and viscosities desired.

spraying pyroxylin thinner through it to avoid mixing of materials of different colors.

Note: The remainder of this article, taking up operations Nos. 10 to 16 inclusive, will appear in June issue.

Cleaning Aluminum Castings

In the March issue, there was a very interesting article by Henry H. Smallwood on "Cleaning and Baking Aluminum Castings," see page 69.

Things change so rapidly nowadays that it is usually not advisable for anyone to make definite statements about almost anything in the world, much less factory procedure. You see Mr. Smallwood definitely states "Sandblasting is, without a doubt, the best method of cleaning at this point." Mr. Smallwood refers to cleaning these castings before japanning or enameling.

While sandblasting is a most excellent method of cleaning, nevertheless, it is rather expensive for the average plant to install sandblasting equipment. Of course, in the past there was absolutely no other way to clean aluminum castings because, if they were put in the ordinary alkaline cleaning solutions, they would become badly tarnished.

However, having been developing industrial cleaning products for over a quarter century, the International Chemical Co. about five years ago, developed several special chemicals for cleaning aluminum castings and soft die castings. These products clean castings rapidly and thoroughly without the least danger of tarnishing.

Nowadays the average plant could very safely adopt the following procedure for cleaning aluminum castings: Make up a

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Farmers Bank Building, Pittsburgh, Pa.
Manufacturers of Lacquers and Allied Products

solution of suitable compound in the proportion of from 2 to 4-oz. to the gallon of water. This solution is to be kept in a wooden or metal tank heated by means of steam coils, preferably placed on the side of the tank from which the work is to be removed. The temperature of the bath should be kept at around 150 to 170-deg. F.

To clean the castings, merely place them in a large basket and immerse them in the cleaning solution. Allow them to remain there for a few minutes until, upon removal from the solution, they do not show a water break. This will mean that they are chemically clean and ready for enameling, japanning, or even electro-plating.

After the castings are removed from the actual cleaning solution they should be rinsed in a solution of clear hot water, which will remove the last semblance of impurities and foreign materials, and it will accelerate the drying. By handling the aluminum castings or die castings in this manner, cleaning is put upon a production basis at very little, if any, outlay for equipment.—International Chemical Co.

White and Light-Tinted Enamels

Possibly the most difficult paints to handle are the white and delicate tinted enamels; these enamels are of two kinds, namely, elastic oil-enamels and hard varnish-enamels. The former are slow drying, and if thinned to any great extent with turpentine, they soon lose luster. The varnish-enamels are usually quick drying and will stand a moderate amount of thinning.

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Does More but Costs no More

WHEN you use pure shellac, you do so because you want the most protection you can get with a finishing coat. If you use Du-Pros Shellac, you use the best. Du-Pros is the only shellac made by the double process. The extra process gives extra value.

Strictly pure, of course.

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It was our ambition for decades to have lacquers and lacquer enamels excel regular paints and varnishes not only in technical advantages and chemical supremacy, but also in dollars and cents. This is now realized in AROLAC Products. By this, we mean, first: the *covering capacity* of AROLAC; and second: the *price* which makes the use of AROLAC an obvious necessity.

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Wood lacquer, Silver and Aluminum lacquer, Bronze lacquer, Brush Brass lacquer and enamels in all colors, glossy and egg shell finishes.

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Consult us relative to your Paint and Varnish requirements and we will be pleased to serve you.

SAMUEL H. FRENCH & CO.
Paint, Varnish and Lacquer Manufacturers
Philadelphia
Established 1844 Incorporated 1920

The liquid part of varnish-enamels generally consists of a mixture of damar varnish and pale wood-oil varnish, thinned with turpentine and benzine, consequently the proper "thinner" for such enamel would be a mixture consisting of the following liquids, blended together:

2 parts damar varnish,
1 part pale finishing varnish,
1 part benzine.

Generally, the pigment part of all white and tinted enamels is either French process zinc oxide or a combination of zinc oxide and lithophone. The latter pigment has the peculiar inherent property of turning gray when exposed to strong sunlight, and bleaching out white again when kept in the dark.

This was a much more serious fault a few years ago than it is now, because the manufacturers can now minimize that feature so that present supplies are very satisfactory; the photogenic properties are reduced to practically nil by the paint maker who grinds 20 percent of zinc oxide with 80 percent of lithophone (1 part and 4 parts) in paint for exterior work.

Lithophone possesses great hiding power—much greater than zinc oxide—therefore a combination pigment containing lithophone enables the paint maker to produce enamel with appreciably less pigment paste per gallon of varnish, thereby enhancing the luster of the goods. The amount of pigment paste per gallon of liquid has much to do with the luster of either an enamel or a varnish color.

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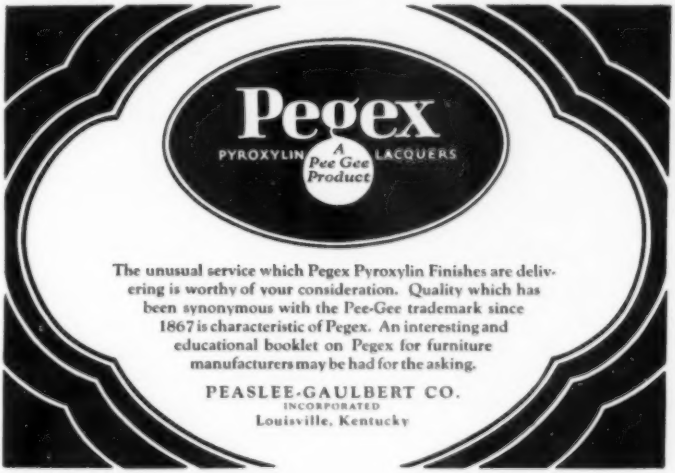
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carry from 50 to 100 percent more paste than do the gloss goods. An excess of paste nearly always results in a flatting effect, therefore the less paste used, the greater will be the luster of the enamel or other goods.

Old enameled work is usually exceedingly hard, and difficult to recoat, due to the absence of "tooth." It is customary to sandpaper the surface or remove the gloss before repainting. Undoubtedly sanding is the most efficient method, but some finishers prefer to go over the surface with a mixture of equal parts of benzole and turpentine. Simply rubbing the surface with a cloth moistened with this mixture is sufficient to remove the gloss.—B. Villa.

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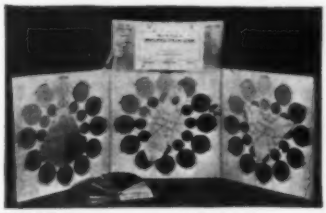

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cleanly cut than they could have been made with the brush—and the work was done in but a fraction of the time required for brushing.

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Advertisers in this Issue

Adams & Elting Co. 65
Arco Company, The Third Cover
Arizona Lacquer Mfg. Co. 90
Armitage & Co., John L. 46
Ault & Wiborg Co. Back Cover

Berry Bros. 11
Binks Spray Equipment Co. 25
Boston Varnish Co. 13

Campbell Co., M. I. 93
Chase, Roberts & Co. 87
Commercial Solvents Corp. 96
Compound Specialty Co. 96
Cooper & Co., Chas. 62-64-98
Curtis Pneumatic Mchy. Co. 79

Dakalite Products Co., Inc. 98
Day & Co., James B. 89
Denny, Hilborn & Rosenbach 6
Detroit Rubber Products Co. 73
DeVilbiss Mfg. Co. 18-19
Dolan & Co., V. J. 85
Drying Systems, Inc. 68
DuPont de Nemours & Co., E. I. 17

Egyptian Lacquer Mfg. Co. 54-55
Eureka Pneumatic Spray Co. 97

French & Co., Samuel H. 90

Gibraltar Lacquer Co. 81
Glidden Co., The Front Cover
Goldschmitt, Chas. 92
Grand Rapids Blow Pipe and Dust Arrester Co. 52
Grand Rapids Varnish Corp. 41
Griffiths & Co., K. F. 95

Hilo Varnish Corp. 2
Hobart Bros. Co. 100

Indianapolis Varnish Co. 61

Jamestown Wood Finishing Co. 82

Kay & Ess Co. 68
Kroeger Bros. 88

Lacquer & Chemical Corp. 80
Larkin Co. 84
Lilly Varnish Co. 4-5
Lindeman Wood Finish Co. 1
Lockwood & Co. 71
Lucas & Co., John 38

Maehler Co., The Paul 67
Marietta Paint & Color Co. 43
Mellish-Hayward Co. 44-45
Miskella, William J. 93
Murphy Varnish Co. 49

Nixon Nitration Works 86

O'Neil Duro Co. 35

Paasche Airbrush Co. 29
Peaslee-Gaulbert Co. 91
Paramet Chemical Corp. 94
Pecora Paint Co. 63
Pittsburgh Lacquer & Chemical Co. 88
Polk & Co., R. L. 97
Pratt & Lambert-Inc. 59
Pulmosan Safety Equipment Corp. 92
Pylam Products Co. 85

Quincy Compressor Co. 77

Rauh, Inc., Robert 98
Rockford Varnish Co. 27

Sargent-Gerke Co. 91
Sharples Solvents Corp. 23
Smith-Monroe Co. 56
Spruance Co., The Gilbert 31
Spraco Painting Equipment Co. 33
Standard Shellac Co. 99
Strand & Co., N. A. 97
Stickney Color Co. 85
Sun Varnish Co. 15

Valentine & Co. 51

Walker Co., Henry V. 87
Watson Co., Geo. E. 95
Waukegan Chemical Co. 37
Willgood Mfg. Co. 94
Worthington Pump & Machinery Corp. 75

Zapon Co., The Second Cover
Zeller Lacquer Mfg. Co. 83

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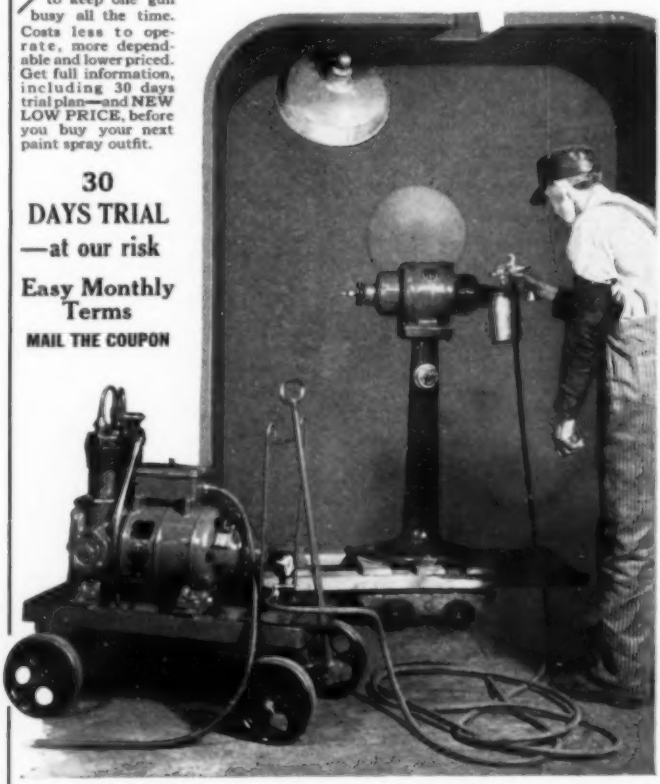

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